

THE
**MEDICAL JOURNAL
OF AUSTRALIA**

VOL. I.—10TH YEAR.

SYDNEY: SATURDAY, MAY 26, 1923.

No. 21.

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Table of Contents

	PAGE.		PAGE.
ORIGINAL ARTICLES—		UNIVERSITY INTELLIGENCE—	
"Albuminuria in Young People," by S. FANCOURT McDONALD, M.B., B.S., M.R.C.P.	571	The University of Sydney	594
"Renal Efficiency Tests," by M. GRAHAM SUTTON, M.B., CH.M., F.R.C.S.	574	NAVAL AND MILITARY—	
REPORTS OF CASES—		Appointments 595	
"Recovery from Hemophilia after Operation for Ruptured Appendix," by P. L. HIPSLEY, M.D.	584	POST-GRADUATE WORK—	
REVIEWS—		Special Lectures in Melbourne 595	
The Liver	584	SPECIAL CORRESPONDENCE—	
LEADING ARTICLES—		London Letter 595	
Clinical Pathology	585	CORRESPONDENCE—	
CURRENT COMMENT—		The Medical History of the War 596	
Stabilizing Operations on the Feet	586	A Philosophical Consideration of Divine Healing 596	
ABSTRACTS FROM CURRENT MEDICAL LITERATURE—		PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—	
Morphology	588	Victoria 597	
Morbid Anatomy	589	BOOKS RECEIVED 598	
BRITISH MEDICAL ASSOCIATION NEWS—		MEDICAL APPOINTMENTS 598	
Scientific	590	MEDICAL APPOINTMENTS VACANT, ETC. 598	
Notices	594	MEDICAL APPOINTMENTS: IMPORTANT NOTICE 598	
Missing Journals	594	DIARY FOR THE MONTH 598	
		EDITORIAL NOTICES 598	

ALBUMINURIA IN YOUNG PEOPLE.¹

BY S. FANCOURT McDONALD, M.B., B.S. (MELBOURNE),
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Honorary Physician, Hospital for Sick Children, Brisbane.

I INTEND dealing to-night with the question of albuminuria in young people, that is, those under twenty-one years of age, almost entirely from the clinical standpoint, whereas Dr. Sutton will give you an account of the various tests for renal efficiency and their application.

First and foremost I intend to exclude two forms of albuminuria which are easily distinguished: (i.) The albuminuria of acute nephritis and of large pale kidney; in both of these there is very obvious oedema. (ii.) Albuminuria in pyuria, which has very characteristic urinary and clinical features.

There remains the question of albuminuria discovered in a young person in whom no renal disease is suspected to exist. The following are two examples:

I. Miss B., *etatis* seventeen years, has had attacks of being "off colour and languidness" for the past two years, especially at her menstrual periods. After a year of this her urine was examined and was found to contain a large amount of albumin, which, however, was almost absent from the morning urine.

She now has occasional headaches and occasional vomit-

ing attacks apart from the catamenia. There is dyspnoea on exertion, but no oedema of the feet. She has lost a little weight.

Physically there is little to be noted, except that the apex beat of the heart is one centimetre outside the nipple line and that the systolic blood pressure is 210 millimetres of mercury and the diastolic 180 millimetres.

The urine varies in specific gravity from 1.011 in the morning to 1.025 at night. It contains large numbers of granular and hyaline casts and albumin, merely a trace in the morning and 0.5% in the evening. The fundi are normal.

II. Master V.W., *etatis* eighteen years, a telegraph messenger, has never had any previous illness and feels very well in every way. Albuminuria was discovered during a routine service medical examination.

His general physical condition is good. His blood pressure is 110 millimetres and 80 millimetres. The specific gravity of the urine is from 1.018 to 1.025.

The albumin is 2% when he is up and about; it is absent on rising or after a prolonged rest by day. The fundi are normal.

In many ways these two cases are similar. Two years ago it would have been very difficult to have distinguished between them, though one patient is a "first-class life," the other has early primary chronic interstitial nephritis.

Probably some help may be obtained from the presence or absence of headache for which no other cause can be ascertained, chronic indigestion or any general feeling of malaise or weakness. Sometimes, as in the case of P.J., *etatis* nine years, the patient has a postural albuminuria with no evidence of kid-

¹ Read at a meeting of the Queensland Branch of the British Medical Association on April 6, 1923.

ney lesion, the albumin appearing whenever the patient is run down. The persistency or not of albumin on resting and the presence or absence of casts are also useful signs. In regard to casts there is much difference of opinion. Some hold that casts indicate renal disease; others, notably Maclean, consider that they may occur in normal urine. Maclean found casts in the urine of soldiers in whom there was no other indication of disease and who when traced afterwards showed no tendency to become nephritic. His figures cover some 60,000 patients and show that 5% had albuminuria and 2% casts as well without any other evidence of nephritis.

Personally I am cautious and consider that numerous casts are to be looked upon as a grave sign, especially casts of the granular variety.

Of great importance is the history. In this country primary interstitial nephritis is a very definite familial disease and the discovery of albuminuria in a child, when others have died of nephritis, is a very grave event. The history of any severe illness is important, but I will leave the *post* and *propter hoc* till I deal with the aetiology.

In the later stages there are two very important signs: (i.) Rise of blood pressure, as in the case above mentioned, where it is the decisive feature. (ii.) Low specific gravity, as in the following case:

Miss W., *ætatis* twenty-four years, has had albuminuria for three years. Her blood pressure is 110 and 80 millimetres of mercury. She has albumin in her urine; in the morning specimen about 0.1%. There are no casts. The specific gravity is never above 1.013, usually it is 1.008. There is no polyuria, no nycturia and no oedema. She is now dying of uræmia.

To these two in the later stages we may add frequency of micturition; but only where there is no fluid retention, such as sometimes occurs in the later stages. For example, J.M., *ætatis* twenty years, was found to have albuminuria after a series of bilious attacks eight months before being first seen. At this time he had nocturnal frequency of micturition, but when seen by me he was oedematous and until his death some twelve months after the onset the nycturia ceased.

But these, too, may deceive, as in Miss W., whose blood pressure never rose above 110 and 80 millimetres, who had no diurnal nor nocturnal frequency, but a fixed specific gravity; whose urea concentration was only 1% and who is now dying of uræmia, about three years after the onset of the symptoms.

Again, in a child with secondary interstitial nephritis following successive acute attacks, the specific gravity, usually 1.010 to 1.012, rose to 1.020 during an acute febrile attack of unknown origin.

There is, however, one final and definite clinical sign which has only one meaning—death within twelve months, often less. I refer, of course, to albuminuric retinitis. This should be looked for in every patient with renal signs; it sometimes appears in a few months.

Uræmic attacks are not necessarily fatal immediately. We have a patient (L.) at Rosemount who has advanced war nephritis. He had an uræmic attack last September, with convulsions, coma and hemiplegia, and now seems better than ever.

The value of efficiency tests in these cases is very

great, but, like all tests, a reaction means one thing, failure to react does not necessarily exclude it. The result of a renal efficiency test is part of the evidence on which the physician bases his diagnosis. It is not the diagnosis. Thus on one hand is Miss B., in whom two renal efficiency tests at least give normal results, but the very high blood pressure settles the matter. On the other is Mr. S., who has had albuminuria with numerous casts for some ten years. He now is very much affected according to all efficiency tests, but he has no nycturia; he has a low blood pressure and seems perfectly well and comfortable.

The most important renal test we still lack, one that will show very early renal disease as distinguished from simple albuminuria. Our various tests are excellent, but by the time that they are effective, the damage is extensive and irreparable.

There is one last symptom—pain in the back. Pain in the back is always found in the soldier who has had war nephritis, whether he now has any sign of renal damage or not. Among civilian patients pain in the back is a rarity. I often wonder how much a certain advertisement has to do with this constant military symptom.

Aetiology.

The aetiology of orthostatic albuminuria is not definitely known, but it is often seen in entirely healthy individuals and there is ascribed to "leaky kidney," whatever that means. It is often found in children somewhat below par physically, as in P.J., *ætatis* nine years, who developed a very severe orthostatic albuminuria during a long and undiagnosed illness, possibly associated with some form of sepsis; the albuminuria reappears whenever his general health suffers. In some cases the albuminuria accompanies lordosis.

As to the other—the organic form—there are (a) causes known, (b) causes unknown, (c) causes hypothetical.

In the cases known—the proportion is very low—there is usually failure of complete recovery after an attack of acute nephritis:

F.W., *ætatis* ten years, had acute nephritis in May, 1921. A year later the specific gravity of his urine was from 1.010 to 1.015. There was polyuria and nycturia. The urine contained a small amount of albumin, granular and hyaline casts. The urea concentration was 1%.

The number where causation is unknown is larger. Long and persistent questioning fails to reveal anything. Sometimes there may be a history of repeated sore throats, perhaps even scarlet fever. But there are many others in whom nothing can be found; there is no history of previous acute attacks, no history of syphilis, no sign of any other disease. Moreover, scarlet fever is a disease in this country much less liable to produce nephritis than is commonly supposed.

Family Incidence.

A very important factor in this country seems to be the family one. We hear of all the members of a family dying one after another as they reach adolescence. In such cases we ought to be able to find one common factor, but so far none has been discovered.

Recently Shaw Dunn who with McNee did so much work on the histology of war nephritis, has shown that in all these cases of chronic interstitial nephritis there is evidence of a general chronic process affecting the kidney and that the condition is entirely different to that seen in the arterio-sclerotic kidney.

There arises the vexed question of lead. At present I have one small patient with signs of interstitial nephritis. She gives a definite history of plumbism and still shows the long persisting basophilia so often seen in that disease. But so does the above mentioned child, F.W., who has no history of lead whatever.

At a clinical meeting last year we showed you twenty-four patients suffering from plumbism. Of those four had an albuminuria which was much higher than the usual 5% that Maclean found among his soldiers.

Dr. Thelander has, I believe, been searching his records for the relationship of previous lead intoxication to eclampsia and I shall be glad to hear from him, but in this matter it is essential to discriminate between facts and opinion.

Treatment.

The treatment of orthostatic albuminuria is a very real and often difficult matter. To the average individual albuminuria means Bright's disease and much effort is required to prevent these unhappy people subjecting themselves to a régime of semi-starvation, coddling and invalidism for the rest of their days. Vigorous counter measures in the way of fresh air, generous diet, exercise and mental stimulation are all of great value and, in view of our helplessness before interstitial nephritis, I sometimes wonder whether in these it is not a good thing to be occasionally mistaken in a diagnosis and unduly optimistic. It probably does little to hasten the inevitable end and gives the patient some months or even years of peace of mind.

As to the treatment of the organic cases, personally I know of few diseases where we are so helpless. So notorious has the helplessness become that one hears of families where one child after another has died and the parents refuse to consult a doctor again: "For," say they, "he can do nothing." Hence these patients are the joy of quacks and unqualified practitioners, who are constantly proclaiming cures. Considering that the diagnosis of nephritis is not always easy, I expect that they get a good many of our mistakes and do very well with them. With the true nephritis their results and ours are the same.

First and foremost I do not think that there is any drug in the Pharmacopœia which in any way stays the process once begun. There are one or two that are useful adjuvants; that is all.

Diuretics are perfectly useless, especially when there is any tendency to œdema, except urea. This is given in water, fifteen grammes thrice daily, and is not open to the same objection as is the giving of large quantities of protein in chronic interstitial nephritis, with retention of water and nitrogen.

Next comes the question of diet. To many people albuminuria means a milk diet, though fortunately most milk foods contain more carbo-hydrate than they do milk. Some, however, would keep unfortunate patients on nothing but milk for weeks at a time.

Now consider what are the daily requirements of the body (i.) in repair tissue, especially protein, (ii.) in fuel, which may be fat and carbo-hydrates.

(i.) Opinions vary as to the amount of protein required daily. Some give as little as thirty-five grammes for a sixty kilogram (about nine stone) man; others, including Maclean ("Glycosuria," page 114) demand one gramme per kilogram per day, that is, sixty grammes for one sixty kilogram man. Now milk contains from 3.5% to 4% of protein, so to provide the day's supply on milk only we should need a litre to a litre and a half (about one and three-quarters to three pints).

(ii.) The normal individual requires at least twenty-five to thirty calories per kilogram, so that one sixty kilogram man will need 1,500 to 1,800 calories.

An ounce of milk yields twenty calories and one hundred cubic centimetres seventy calories. Thus fed on milk only our patient would require two to three litres (seventy-five to ninety ounces) of milk daily. Again a milk diet, besides being very bulky, is very ill-balanced. Our normal dietary consists usually of about protein, 12; carbo-hydrates, 50; fat, 5; whereas milk contains almost equal amounts of its different food constituents—exactly what we do not want in nephritis.

I think it is now generally agreed that the best diet for these patients is one containing the minimum (at Rosemount thirty-five grammes seems sufficient) of protein, the caloric value being made up by carbo-hydrates mainly, with much smaller amounts of fat. To many patients who are losing large amounts of albumin daily, I believe it is essential to give much more than the minimum protein ration of a healthy person. One point, however, about the protein intake. It should be (i.) more digestible, hence such food as chicken and fish are more useful than beef or mutton; (ii.) it should have as little nitrogenous residue for the kidney to excrete as possible, hence the diet should be low in purin-rich bodies.

I find many of my colleagues regard eggs as especially harmful in nephritis. The only reason that I can find is that if we administer a large amount of raw egg, it is possible to recover albumin in the urine of a healthy person. Personally I look on eggs as a most valuable food in nephritis, when the patient can digest them, which is by no means always the case. It is often thought that an increase of protein in the food means an increase of protein in the urine, but there is no evidence whatever of this. We must remember, too, that all protein which the body really uses, is absorbed as the very much simpler bodies, mainly amino acids, which protein digestion finally produces.

Unless there is definite evidence of fluid retention, I think that these people should be allowed to drink as much fluid as they like. With the increased

urinary output of so many, owing to the kidneys' inability to excrete any but a very dilute urine, an increase in intake is essential. Probably the purin-containing drinks—tea and coffee—are better avoided and cocoa, water, mineral waters, effervescent drinks and barley water are to be preferred. Alcohol is to be strictly forbidden and tobacco permitted only in great moderation.

In regard to general hygiene and way of life there are two essentials—moderation and comfort. Moderation in all things; do not overdo treatment, do not constantly remind the patients of their condition, do not insist on them wearing specially heavy clothes. Remember Uncle Joseph's trials in this respect. In fact you might give them the child's rules of health as a good guide: A bath once a day. Fresh air during the day. Plenty of water or milk instead of tea or coffee. Vegetables instead of meat. Teeth cleaned after every meal. Early to bed and sound sleep. A bowel action once a day.

Surgical Treatment.

Edebohl's operation is not suitable in these cases.

Prognosis.

Do some of those young people with postural albuminuria later develop nephritis? I think we can only say, we do not know. One branch of our profession to whom we should look for information in the matter, is the medical referees of our big insurance companies. I hope you all read Dr. Scot Skirving's article on life insurance examinations in *THE MEDICAL JOURNAL OF AUSTRALIA* of March 3, 1923.

The section on albuminuria is most instructive and I wish he would some day investigate how many, if any, of those who died of nephritis in later life, had albuminuria at their first examination. Maclean found that albuminuria in troops did not predispose them to nephritis on entering areas where the disease prevailed.

As to the others, the patients with chronic interstitial nephritis, the condition seems to be quite hopeless; they go downhill slowly and steadily. I am inclined to think the downward course is more rapid in these young people under twenty-one years of age than those rather older. At least I know of one case of ten years' duration in a patient aged thirty-nine who is still going about well and comfortable, albeit he takes life very quietly and moderately.

The first sign of impending death may be an uræmic fit which may prove fatal, or signs of albuminuric retinitis or continued rise in blood pressure.

It is not a hopeful subject, but the more we talk and think about hopeless subjects, the more likely are they to cease to be hopeless.

Literature.

One of the best accounts of interstitial nephritis (small pale kidney) from the clinical standpoint is still that of J. Rose Bradford in Allbutt's "System of Medicine." Of more recent work for most of us there is little to equal Hugh Maclean's little book on "Nephritis" (and his last book on "Glycosuria" is equally worthy of note and is in many ways a complement of the first). Much of the best on treat-

ment was written by von Noorden in his little monograph. These will not give you a complete knowledge of the theories of physiology, pathology and bio-chemistry of the disease, but they will give you much simple, practical and straightforward information.

RENAL EFFICIENCY TESTS.

BY M. GRAHAM SUTTON, M.B., CH.M. (SYDNEY),
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It was with some reluctance and a good deal of diffidence that I accepted the invitation to read a paper on the subject I have the pleasure to bring before you to-night. For I feel that I am not well qualified to deal with such an important subject and that I have not had the experience in it I would like to have had before doing so. However, I have taken the liberty and must do my best and trust that you will forgive my shortcomings.

At the outset I may say that I have nothing to bring forward that is new or that has not appeared in the various journals and recent books from time to time, but I have endeavoured to collect this into a paper in order to present to you the "pros" and "cons" of what might be termed blood and urine chemistry in clinical medicine as applied to renal efficiency tests.

First of all I propose to review the most important medical and surgical conditions in which these tests have been invoked.

MEDICAL.

For many years the diagnosis of kidney disease has depended largely, apart from clinical findings, on the result of analysis of the urine. But recently this has been found to be a less reliable guide than was formerly thought.

Many observers now believe albuminuria and even casts do not in themselves mean kidney disease and, on the other hand, that the absence of albumin and casts in the urine does not exclude the possibility of nephritis. While I am willing to concur in the latter, I regard the former part of this statement as rather too serious a blow to clinical medicine to be tenable in the present state of our knowledge.

Besides these observations there are certain clinical contingencies in which renal function tests may be of great service in diagnosis.

The Condition of the Heart and Arteries.

A knowledge of the state of the heart and arteries is a great help in diagnosing and in forecasting the probable course of chronic interstitial nephritis and one will often be correct in assuming that a patient with arterio-sclerosis and a high blood pressure has nephritis as well, especially if there are cardiac changes *plus* albumin and casts in the urine. But there are undoubtedly exceptions and it is just in these cases that renal efficiency tests can help. It is important to know all the facts of such a case, be-

¹ Read at a meeting of the Queensland Branch of the British Medical Association on April 6, 1923.

cause the prognosis is much more hopeful in patients with high blood pressure without renal involvement or with only slight impairment compensated with nocturnal polyuria. Apart from cerebral hæmorrhage, such a patient may live for several years in comparative comfort, provided he observes the rule of "moderation in all things."

Conversely there are many patients with interstitial nephritis in whom the blood pressure is only slightly raised and with little evidence of cardiovascular change, but with seriously damaged kidneys. We may assume renal disease or not, as the case may be, but it does not always pay to assume, since such patients may "go west" contrary to expectation or "south" for a revised and would-be better opinion.

Examination of the Urine and Blood.

Again, in many cases it may be quite impossible to decide by clinical means to what extent a patient's symptoms are due to cardiac or to renal involvement. As a matter of fact, I should say one rarely fails to differentiate between a case that is primarily renal with cardiac embarrassment as only a secondary occurrence and one that is primarily cardiac while the renal derangement is only a result of passive congestion. But in the full bloom of both affections it is often very difficult to differentiate between the two conditions. Both are grave and when the patients are seen for the first time, they may be semi-conscious or unconscious, the renal patient in uræmia, the cardiac patient in decompensation. They may both have dyspnoea or orthopnoea. Both may have œdema of the lungs with the expectoration of bloody or frothy watery material associated with œdema and ascites. Both may have a history of several weeks of shortness of breath, with swelling of the feet and ankles preceding the attack. On examination nothing characteristic is noted about the pulse, which may be strong or weak and irregular in either; nor in the heart, which may be enlarged or displaced. The blood pressure in either case may be the same. In fact, such a problem is only solved on the autopsy table as a rule, but it can generally be easily solved by renal function tests. For though the blood urea may be high in both cases, the urea concentration will be high in patients with cardiac affection; when high blood urea concentration is due to renal defect the urea concentration will be low. The diagnosis is important because the treatment is so different. For example, hot packs for cardiac affections would be unwise. Morphine, often necessary and beneficial for cardiac patients, would be dangerous in renal affections, especially with œdema of the lungs. Kidney stimulants are not considered good practice for renal disease, but are very helpful in relieving the œdema in patients with cardiac trouble. Given a correct diagnosis and bearing these points in mind, we are in a much better position to order treatment for the relief of the cardiac or renal embarrassment and thus perhaps to tide the patient over for some length of time.

J.M., *etatis* seventy-five years, was so breathless that he could not lie down at all. He had definite œdema of the legs extending up to the nipple line. There was ascites

and the liver was enlarged. The heart was enlarged to two fingers' breadth outside the mid-clavicular line. The apex beat was in the sixth space and heaving in character. Diastolic and systolic murmurs were heard at the apex and were conducted half way into the axilla. There was cough, with expectoration of frothy material; œdema of the bases of both lungs was detected on auscultation. The pulse was irregular in force and rhythm. The arteries were thickened and tortuous. The systolic blood pressure was 210 millimetres for the strongest beats and the diastolic 110 millimetres. The urine was very scanty. A specimen (thirty cubic centimetres) passed during the hour blood was taken was examined. It was high coloured. The specific gravity was 1.022; it was acid and contained 0.31% of albumin with hyaline and both types of granular casts. The urea content was 2.65%. The blood urea was 18.5 milligrammes per hundred cubic centimetres and the creatinin was 2.5 milligrammes. The urea concentration factor was 143. The urea concentration test (done next day) yielded in the first hour thirty-five cubic centimetres passed, with 2% of urea; in the second hour ten cubic centimetres of urine, with 1.9% of urea.

It was concluded that the kidneys were quite efficient and that the condition was primarily cardiac decompensation. He was treated with tincture of digitalis and saline cathartics and morphine was given without hesitation when indicated by restlessness, especially at night. He could not afford to remain in a private hospital and went to the general hospital. He was then able to sleep lying down and with a lessened amount of œdema.

Latent Nephritis.

Another class of case in clinical medicine is the one of latent nephritis displaying symptoms referable to the gastro-intestinal tract and often diagnosed as simply dyspepsia, gastric ulcer or gastro-enteritis. The symptoms may be nausea, vomiting, loss of appetite, abdominal distress and flatulence, usually vaguely related to food and headache suggestive of migraine.

Gastric symptoms, according to Chase,⁽¹⁾ are among the most common early symptoms of nephritis and he recommends a complete chemical analysis of the blood in cases of obscure gastric disturbance. If the symptoms point to gastric ulcer, perhaps a barium meal might be given first.

The following will exemplify this type of case and will also serve to illustrate how misguided attempts at relieving a kidney, considered badly diseased as judged by the results of an analysis of the urine alone, by strict non-protein dieting may undermine the general health and physique of a patient:

Miss K., *etatis* twenty-six years, when eighteen years of age was found to have albumin in her urine and was refused admission to a lodge on that account. Not only this, but she was dieted most strictly and lived for eight years on milk, milk puddings and vegetables principally. She came to me complaining of a pain in the epigastrium and a feeling of gastric discomfort, occasional heart-burn and some flatulence. She had occasional headaches and habitual constipation. She felt tired and was not benefited by a night's rest. The duration of her indigestion was four to five months and of her constipation years. She had lost nearly three kilograms (half a stone) in six months. She was thin and gaunt in appearance and of a sallow complexion. Her height was 162.5 centimetres (five feet four inches), her weight 48.3 kilograms (seven stone thirteen pounds). She came of big parents and should have been fifty-eight kilograms (nine stone two pounds) for her height. Her heart was not enlarged; the sounds were normal and there was no accentuation of the second aortic sound. No abnormal signs were detected in the chest. The arteries were not thickened. Her teeth and tonsils were healthy. Her systolic blood pressure was 120 millimetres of mercury and diastolic 70 millimetres. The

hæmoglobin value was 90%. The eye grounds were normal. The urine contained a definite cloud of albumin, with a few coarsely granular casts on several different occasions.

The question was: Was she suffering from nephritis with gastric symptoms, a gastric ulcer or a simple dyspepsia the result of her diet? On account of the fact that the epigastric pain had no definite and constant relation to food, I did not put her to the expense of a barium meal and ruled out gastric ulcer as a diagnosis. Her renal function was found to be normal, as shown by the following tests:

The blood urea measured eleven milligrammes per hundred cubic centimetres of blood. The response to Mosen-thal's two-hour test was normal. The specific gravity of the urine varied ten points between the highest (1.028) and the lowest (1.018). The total volume of the urine was 552 cubic centimetres, of which night urine was 280 cubic centimetres. The chlorides measured 6.60 grammes in twenty-four hours. The response to the phenol-red test was normal. In the first hour it was 44.8%, in the second hour it was 11.5%, while the total was 56.3%. The urea concentration test yielded 3.15% of urea in the second hour, that is a normal amount.

She was allowed a more liberal diet and given a simple digestive mixture and liquid paraffin and is now very much better.

I regard her condition as one of nephritis with efficient kidneys, in spite of the fact that several of her morning specimens contained no albumin, because of the presence of granular casts and the result of a postural test which failed to cause albuminuria.

The Significance of Albuminuria.

Albuminuria is by no means a rare condition and is often present in the absence of Bright's disease. In every case it is essential to have the kidneys examined by these tests because (i.) it is no proof of nephritis and (ii.) even when the patient has previously had acute nephritis, it does not indicate a progressive lesion. The previous speaker has dealt fully with this subject.

Nephritis in Plumbism.

It is well known that lead poisoning of long standing causes nephritis, but it would be useful to know whether in the more or less acute cases with papilloedema which have cleared up under treatment, there is any damage done to the kidneys. Renal function tests might help in deciding this.

Toxæmia of Pregnancy.

Lastly it has been found a difficult problem to make a diagnosis between toxæmia of pregnancy and previous renal insufficiency, on account of the fact that the kidney of pregnancy is a combination of the hydremic and azotæmic types of nephritis, as shown by the œdema and the lowered power of urea concentration, and does not differ functionally from that in a mixed nephritis in the non-pregnant.

The mere presence of albumin (as ordinarily tested for) in the urine helps but little in distinguishing the two conditions, since it may be present in both or absent in the more serious cases of toxæmia. But one must not forget the history before pregnancy and after labour, nor the signs and symptoms.

On general lines toxæmia occurs more frequently in primiparæ; there is œdema of the lower limbs; serum-globulin is present in the urine and the urinary diastase content is high (normal in blood). Acidosis more frequently occurs, but rarely albu-

minuric retinitis. The blood urea is not increased, but the urea concentration test gives low figures and with this there is a rise of blood pressure. The latter two signs are the more valuable for prognosis and treatment.

In nephritis in pregnancy symptoms occur more often in multiparæ. There is œdema of the face and arms, serum-albumin is present and the urinary diastase content is low (but high in blood); sometimes there is albuminuric retinitis. Albuminuria persists after the uterus is emptied. The urea concentration is low here also, but the blood urea is increased.

Normal pregnant women give a low blood urea and the urea concentration test gives normal results.

In investigating a case of albuminuria of pregnancy Mackenzie Wallis recommends the examination of a fresh specimen of urine for albumin, globulin, casts and diastatic activity. This should suffice in a case of toxæmia, but may be confirmed by finding the urea concentration low and the blood urea practically normal. The presence of albumin and casts and a low urinary diastase content speak for nephritis, in which case the response to the urea test will be low also, but the blood urea will be raised. De Wesselow suggests that a blood urea above forty milligrammes per hundred cubic centimetres is an indication for induction and in the absence of this test this must be considered with a urea concentration figure below 2%. Repetition of both tests is useful, since rising blood urea, together with falling concentration indicates a progressive lesion.⁽²⁾

SURGERY.

In the surgery of the urinary organs and kidneys themselves tests for renal efficiency fall into two categories: (i.) The adequacy of both kidneys. (ii.) That of either kidney separately.

Adequacy of Both Kidneys.

Under the first come patients suffering from retention of urine from any cause (such as from enlarged prostate, stricture of the urethra or contraction of the bladder neck). These patients should be carefully examined for renal efficiency before any surgical procedure is undertaken, in order to ascertain whether the kidneys are so badly damaged by back pressure as to require a two-stage operation or not. If we are able to detect this damage before the operation and to carry out surgical drainage of the bladder until the kidneys have recovered their function, as shown by these tests, surely our position from the surgical point of view is enhanced.

Adequacy of Each Kidney.

Into the second category fall those cases in which for any reason nephrectomy is contemplated. We want to know if another kidney is present and capable of carrying on the functions required of it in the face of the operative attack on its fellow of the opposite side.

Functional tests may also make early diagnosis possible in some cases (such as of hæmaturia), but they must be repeated often enough to be sure that the condition is permanent. Again, if the tests fail

to show a definite difference on the two sides, it is not safe to conclude that neither of the kidneys is affected, since obviously a small neoplasm may exist, causing hæmorrhage without sufficient alteration in the renal parenchyma to influence the tests.

In the presence of a tumour and pain simulating renal colic, renal function tests may be of value in deciding whether the neoplasm is renal or extra-renal (hepatic, biliary or intestinal).

Lastly, many of the obscure deaths after general surgical operations are probably due to unsuspected renal insufficiency which, had it been detected before operation by the use of these tests, might have led to a wiser choice of anæsthetic or a safer technique and a living, well patient rather than a brilliant operation and "flowers."

I have had no cases of prostatic obstruction since I have been doing blood chemistry, but the following is a case with normal function tests and a happy result:

J.K., *ætat*s seventy-four years, complained of dysuria with nocturnal frequency, worse the last two years. His heart was normal, but his chest was emphysematous. The systolic blood pressure was 140 millimetres of mercury. The prostate was felt to be somewhat enlarged *per rectum*, but more so intravesically, as shown by the cystoscope. There were seventy-one cubic centimetres (two and a half ounces) of residual urine; it was acid and contained no pus, blood nor albumin.

Mosenthal's two-hour test gave a variation of ten points between the highest specific gravity (1.025) and the lowest (1.015). The total quantity of urine in twenty-four hours measured 1.53 litres (fifty-four ounces), of which a little over one litre was excreted during the day and four hundred and fifty cubic centimetres were excreted during the night. The pthalein test yielded in the first hour 41% and 17% in the second, making a total of 58% normal.

As the patient was inclined to be "chesty," the bladder was opened under local anæsthesia and the prostate enucleated two days later under a short general anæsthesia. His recovery was uneventful.

METABOLISM.

Proteins.

Having given you an idea of the kind of information to be gained from renal efficiency tests, a very brief reference to protein metabolism and the functions of the kidneys will put us in a position to grasp the rationale of the chief of these tests.

Since there will be repeated reference to the non-protein nitrogenous blood constituents, let me explain that the blood consists of two parts, the cellular elements and the plasma. It is with the constituents of the plasma that we are concerned. The plasma contains the proteins—serum albumin, serum globulin and fibrinogen and the non-proteins, which are both nitrogenous and non-nitrogenous. The nitrogenous non-proteins are urea, uric acid and creatinin chiefly. The non-nitrogenous non-proteins may be enumerated in the order of their physiological importance, as follows: water, chlorides, bicarbonates, phosphates, sugar and cholesterol.

Non-Protein Nitrogenous Constituents.

The origin of the non-protein nitrogenous constituents may be summed up in the following statement: Urea is almost wholly exogenous and is formed largely in the liver from the ammonia resulting from the deamination of the amino-acids set free in

digestion, but not of immediate use to the organism. This ammonia is converted by combination with the most available acid, namely, carbon dioxide, to form ammonium carbonate, which is rendered innocuous by being formed into urea, which is then eliminated by the kidneys. The normal person requires what may be termed a "pressure head" of fifteen to twenty milligrammes of urea per hundred cubic centimetres of blood in order to get rid of the twenty-five to thirty grammes of urea excreted daily in the urine. The chronic interstitial nephritic excretes practically the same amount of urea *per diem* as the healthy person on a similar diet, but to do so he requires a greater "pressure head" of urea in the blood, sixty to two hundred milligrammes per hundred cubic centimetres. Not only this, but it is necessary for his kidneys, not being able to concentrate to the normal degree, to work "overtime" in order to attempt to free the body of urea. Hence the nocturnal polyuria.

Thus loss of concentrating power, nocturnal polyuria and retention of urea in the blood are signs of chronic nephritis of the interstitial type.

Uric acid originates as a result of the enzymatic transformation of the amino- and oxy-purins. It is the end-product of the nucleo-protein metabolism in man. One-half is endogenous and one-half is exogenous.

Creatinin would appear to be formed in the muscle tissue from creatin and is entirely endogenous. It is constant in the body hour by hour and day by day and is not influenced by protein food.

In nephritis the damaged excretory function is manifested first by an increase of the uric acid content of the blood, accompanied later by the retention of urea and in advanced cases by that of creatinin.

The factors influencing the elimination of these metabolites are the quantity and quality of the food, the functional integrity of the glandular organs involved in their elaboration, the state of the circulation and the eliminative power of the kidneys.

Since urea is largely exogenous in origin, while creatinin is endogenous, it is subject to much greater variation, especially under dietary conditions. Uric acid occupies an intermediate position as regards diet.

Consideration will be given later to this aspect of the subject to show how these disturbing factors may be controlled in the practical application of the functional tests now to be discussed.

MODERN TESTS.

With these fundamental facts in mind, we are now in a position to consider the modern methods of testing renal function. These methods may be classified as follows:

1. Blood chemical analysis, *id est*, the determination of the degree of retention in the blood of various metabolic products, such as non-protein nitrogen, urea, uric acid and creatinin.
2. Mosenthal's two-hour test, *id est*, the comparison of the ingestion and excretion of nitrogen, salt and water or more simply the estimation of the

power of the kidneys to eliminate water and to concentrate solids.

3. The indigo-carmin and the phenol-sulphone-phthalein tests, *id est*, the determination of the rate of excretion and power of elimination of a known amount of a chemical substance injected intramuscularly or intravenously.

4. The urea concentration test, *id est*, the estimation of the maximum power of the kidneys to concentrate urea.

5. Hæmo-renal indices or correlation tests, *id est*, the determination of the ratio between the concentration of various metabolic products, usually urea, in the blood and their excretion in the urine, the result being expressed as a ratio of excretion or coefficient, such as Ambard's co-efficient, Maclean's index, a formula suggested by Austin, Stillman and Van Slyke, or a factor denoting simply the number of times one of the metabolic products is concentrated by the kidneys, as found in the urine (Maclean). This simple factor should normally be sixty to eighty; when the renal efficiency is somewhat impaired it may be only thirty to forty. If below twenty, the condition is generally bad and if below ten it is severe. I have no experience of these formulæ and I believe they have been largely given up, except perhaps the last mentioned one, since they apparently give no additional information and are rather complicated. I shall, therefore, not discuss them further. Nor shall I do more than mention the well-known and simple test of injecting indigo-carmin and noting the time it takes to appear at the ureteral meati by the aid of a cystoscope. The test deserves mention, but time will not allow. It is most applicable in surgical cases to decide the presence and functional power of the kidneys separately.

Blood Chemistry.

The Urea Content of Blood.

The American authorities maintain that the blood urea falls within very narrow limits for perfectly healthy subjects (twelve to fifteen milligrammes per hundred cubic centimetres) or in hospital patients a little higher. They regard figures over twenty as indicating impaired renal function when the patient is on the usual restricted diet of a hospital.

In England, following Maclean, the blood urea of normal persons is considered to be between twenty and forty milligrammes per hundred cubic centimetres. "In elderly people on the same diet," he says, "it may be fifty milligrammes or more without any definite evidence of renal disease, apart from the normal senile changes." But note the qualifying phrase. Thus his figures for normal individuals may be put down at from fifteen to sixty milligrammes, according to age and diet. He concludes that a persistent blood urea of over sixty milligrammes in a young man or a little higher in an elderly man is of grave significance, as it indicates that probably about three-quarters of the renal tissue is not functioning. In other words, Maclean's conclusions are that the blood urea is only appreciably increased in bad cases and that its estimation can only be expected to give real information in the more severe cases and later stages of chronic

interstitial nephritis. As a result of this, I think it may be fairly stated that figures from twenty to sixty milligrammes for the blood urea may be taken as a significant sign of impaired renal function and that figures over sixty milligrammes are indicative of really serious renal damage.

In acute nephritis, on the other hand, Maclean considers that the estimation of the blood urea at intervals of from seven to ten days is one of the best methods of gauging the progress of the disease and in a general way the same may be said of sub-acute conditions.

Generally speaking, an increase of urea or non-protein nitrogen in the blood indicates that the kidneys are deficient in proportion to the excess of these bodies present and that on the whole the estimation of the blood urea is of very great assistance in acute and sub-acute nephritis and in many cases of chronic interstitial nephritis, provided certain precautions are taken in interpreting the results and the clinical aspect of the case is taken into account also. Before expressing a final opinion, as to prognosis, it is safer to carry out more than one estimation of urea and this with the patient on the same protein diet as when the first estimation was done. The blood should be drawn under as uniform conditions as possible, that is, in the morning before breakfast, after a twelve to fourteen hours' fast and before any food or drink has been taken. Another check is afforded by the urea concentration test. Thus a high blood urea with a high urea test figure would mean either excessive supply of urea or circulatory embarrassment. Normal or slightly raised blood urea with a low urea test figure would suggest early nephritis, while a high blood urea and a low urea test would indicate an advanced grade of renal impairment. Besides this, resort may be had to the uric acid and to the creatinin and perhaps also the phosphate retention in giving a prognosis.

Creatinin.

Creatinin appears to be more readily eliminated than either uric acid or urea and it is not as a rule until the blood urea has doubled at least the normal figure that there is any appreciable increase in this purely endogenous waste product derived from muscle metabolism. Sometimes, however, the creatinin is increased without an appreciable rise in blood urea, especially if treatment has been commenced.

The normal figure for creatinin in the blood is one to two milligrammes per hundred cubic centimetres and figures over 3.5 milligrammes should be viewed with concern, while figures over five milligrammes almost invariably indicate an early fatal termination, that is, in about six to eight months. The only constant exceptions are acute nephritis and mild bichloride poisoning, according to Myers. Maclean differs in his opinion and says he has seen patients with creatinin values of five milligrammes or more who have been alive two years afterwards; but there are exceptions to every rule. It is no argument against any test to be able to show that it is open to occasional failure. It has to be shown

that this failure is so frequent as to outweigh its usefulness.

Uric acid is the first of the three nitrogenous metabolites to be retained in chronic interstitial nephritis, apparently because it is the most difficult to excrete.

American observers state that when symptoms of gout are absent, a high uric acid figure may be a valuable early diagnostic sign of nephritis, possibly earlier evidence of renal impairment in interstitial nephritis than the classical albumin test and the presence of casts. In fact, some go so far as to say that the uric acid concentration of the blood is a delicate, if not the most delicate, index of renal function at our disposal. Myers does not go so far as this, but says: "There would appear to be little doubt that early cases of chronic nephritis are accompanied by an appreciable rise in the blood uric acid, although a rise in the blood urea can probably be taken as a safer sign of impaired renal function."

In parenchymatous nephritis, on the other hand, the nitrogen retention is comparatively small. The urea, for instance, seldom exceeds thirty milligrammes, except in the terminal stages, and is generally between fifteen and thirty milligrammes. There is very little retention of uric acid either.

The inability to excrete the waste products of nitrogenous metabolism properly is only one of the difficulties which arise in renal disease. In acute nephritis, chronic parenchymatous nephritis and to some extent in the chronic nephrosis of Epstein the oedema is probably dependent on the lowered permeability of the kidneys for chlorides, with their consequent retention. Maclean has pointed out that there is no need to estimate the blood chlorides, since the presence or absence of oedema indicates this and if more information is required, resort may be had to a comparison of the percentage of salt excreted from hour to hour as estimated in the several samples of urine passed in carrying out Mosenthal's test.

It is natural to expect that other salts besides the chlorides should be retained by diseased kidneys and this has been found to be the case in regard to phosphates in chronic interstitial nephritis. There is not necessarily a retention of chlorides with it (*id est*, if the condition is purely interstitial) and their retention does not run parallel with the urea retention. Mariott and Howland pointed this out in 1916 and De Wesselow⁽³⁾ agrees that the estimation of inorganic phosphates in the blood is of considerable value from the point of view of immediate prognosis.

The normal is one to three and a half milligrammes per hundred cubic centimetres, usually less than two milligrammes. In acute nephritis figures from five to seven are common and anything above ten milligrammes denotes an extremely grave prognosis.

This retention of acid phosphates brings about an acidosis from which all persons with advanced chronic interstitial nephritis suffer and from which some actually die.

Besides the value of blood chemistry in diagnosis

and prognosis, it may also help to indicate the proper diet. In acute nephritis the albumin loss is a much less reliable criterion than the blood urea and if this is normal or nearly so, protein may be allowed in considerable amount, especially if there is still oedema. In both types of chronic nephritis considerable amounts of protein may be allowed in the diet, provided there is little or no nitrogen retention in the blood. This is considered good practice if care be taken, as explained above, in interpreting the results.

Blood urea is of less prognostic value than creatinin, but a much better guide as to treatment in nephritis, while uric acid appears to be of diagnostic significance.

Turning now to surgery, Maclean states that in genito-urinary cases, in a general way the blood urea probably furnishes the most information, but that other tests should be performed also. His figures, indicative of danger, are higher than the American authorities. He says no surgical procedure necessitating a general anaesthetic should be carried out on a patient whose blood contains one hundred milligrammes or more of urea per hundred cubic centimetres and that even with lower amounts there is a distinct risk. In such cases the clinical condition, however good, is likely to prove a false guide if operation is undertaken on this alone.

In America the blood urea figure is also relied upon as a good pre-operative prognostic test of the kidney condition in urinary obstruction. Professor Myers says that patients showing urea figures under twenty milligrammes per hundred cubic centimetres of blood may be regarded as good operative risks so far as the kidneys are concerned; when the figures are between twenty and thirty milligrammes the patient should have preliminary drainage; figures over thirty milligrammes are good evidence of renal involvement and therefore afford a rather poor operative prognosis.

On the other hand, Sir J. Thomson Walker⁽⁴⁾ considers that in surgical cases an increase over forty milligrammes per hundred cubic centimetres of blood may be taken as indicative of uræmia and that by this time the patient's condition is obvious clinically and that in urinary surgery the cases in which this examination is most useful are those in which it is already known that the kidneys are damaged; but complications, such as persistent vomiting or drowsiness after an anaesthetic, arise which may be ascribed to other causes than uræmia. A pronounced rise in blood urea would then indicate the condition was due to renal inefficiency. He is still a dissenter in 1923,⁽⁵⁾ but he has not entirely divorced blood urea estimations, for he says: "The decision to operate or refuse operation in a case of enlarged prostate with impaired renal function rests upon the judgement of the surgeon and not on the dicta of the laboratory. . . . What the surgeon requires is as accurate an estimate as possible of renal function at the time of the test. . . . This estimate is most usefully set out in terms of urea elimination and urea retention."

Again, as a result of his experience, Frank Kidd,⁽⁶⁾ after giving five reasons why he prefers to

employ the time test pure and simple rather than quantitative tests in the case of ureteric catheterization when considering nephrectomy, concludes by saying: "I consider the indigo-carmin test the test *par excellence* and in surgery I believe that two classes of tests will survive the probation of time and experience, viz., the dye tests (indigo-carmin and phthalein) and the blood urea and urea concentration test for prostatic and doubtful bilateral kidney disease."

However, he says: "Disease of one kidney (especially neoplasm and hydronephrosis) may so depress the function of the other kidney that it is unwise always to refuse nephrectomy simply because of doubtful functional tests. If the blood urea is satisfactory and if other clinical factors point the road, it is better to give the patient the benefit of the doubt if his disease of one kidney is likely to prove fatal without operation and if there is reasonable evidence that another kidney is anatomically present and not pathologically altered, even though it may not show up perfectly when considered functionally."

Thus in the surgery of the upper urinary tract as well as of the lower, considerable reliance is placed by the authorities in the blood urea and urea concentration test and in both the phenol-sulphone-phthalein test has a definite place; in the former as a time test, in the latter quantitatively. In both cases it is also possible to apply a simple correlation test (such as the urea concentration factor), since only four cubic centimetres of urine are required to estimate the percentage of urea by the hypobromite method and this can be collected from a ureteric catheter in fifteen to thirty minutes.

The position amounts to this, as expressed by Sir J. Thomson Walker:⁽⁵⁾ "It is not necessary for a successful prostatectomy that the renal function should be perfect or even approximately perfect. A reduced renal function may be quite adequate for the operation and the laboratory figures form only one factor in estimating the prognosis for operation among many, such as the constitution of the patient, the condition of the heart and lungs, the experience of the operator, the nursing and the hospital."

This attitude, namely, the consideration of the case as a whole, is of course no different from that adopted in regard to any laboratory test, be it a Wassermann, a Widal or a blood count, and is only in accordance with the dicta of common sense.

Mosenthal's "Two-Hour Test."

This test was originally intended to be carried out as a "test meal of renal function" with the patient on a definitely known diet, containing approximately 13.4 grammes of nitrogen, 8.5 grammes of salt and 1,760 cubic centimetres of fluid and considerable purin material as a diuretic. Subsequently, however, on account of the difficulty and work entailed in weighing out the food and in administering it, the plan of simply allowing the patient to have his usual fare in three meals a day at stated times, while forbidding him food or drink between meals, was devised by Mosenthal. This brought the test into the field of clinical medicine,

whether in hospital or in private practice, and greatly increased its usefulness.

The urine is collected in two-hourly periods during the day until 4 p.m., then again at 7 p.m. and 10 p.m.. The night urine from 10 p.m. to 8 a.m. is also collected. It is important not to begin the collection of the night urine until three hours after the evening meal, in order to avoid the diuretic effect of a meal.

The specific gravity and quantity of each specimen is recorded and the sodium chloride and nitrogen content is also estimated.

To quote Mosenthal: "This test is a quantitative one of the mode of urinary function as measured by the specific gravity, water, salt and nitrogen excretion in roughly two-hourly periods by day and a ten to twelve hour period by night. A normal individual yields specimens with specific gravity figures varying nine to ten points or more from the highest to the lowest, a night urine high in specific gravity (1.018 or more), high in its percentage of nitrogen (above 1%) and small in amount (four hundred cubic centimetres or less)."

As a matter of fact, the quantities of water, salt and nitrogen excreted approximate the intake.

One or all of these factors may show a change, according to the type of renal disease present.

In chronic interstitial nephritis the first signs of impairment are usually demonstrated by the night urine; the quantity becomes increased (over seven hundred and fifty cubic centimetres), while the specific gravity and nitrogen content are lowered. In advanced cases the specific gravity becomes definitely fixed and low and the nitrogen output greatly diminished.

A low specific gravity is found, however, in many other conditions, for example, pyelitis, pyelo-nephritis, polycystic kidney, prostatic hypertrophy, urethral stricture, paralysis of the bladder (from *tubercles dorsalis* or tumour of the cord), *diabetes insipidus* and marked anaemia.

Such patients do well as long as the polyuria compensates for the inability of the kidneys to concentrate.

In acute nephritis, chronic parenchymatous nephritis and myocardial insufficiency there is a high fixed specific gravity and an oliguria, together with a diminished salt output in nephritis.

As a routine the simple procedure of measuring the volume and taking the specific gravity of each specimen will give much valuable information and if more be required the estimation of salt and nitrogen may be carried out as well. But it must be remembered that the quantity values obtained in this test are only reliable when the patient is free from oedema and when the metabolism is in approximate equilibrium. The conditions of the test with the patient on his accustomed diet tend to this. The total quantity figure for salt and nitrogen are, however, of less importance as an indication of renal function, since they depend largely on diet and are metabolic rather than renal questions. Thus if a patient is found to be excreting more than five grammes of sodium chloride in twenty-four hours, it may be assumed that he is having more salt in his diet than he requires and that this may be re-

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duced if the therapeutic indications demand it. If the amount of salt in the urine is very low and oedema exists, this deduction is untenable. Nevertheless, the maximum salt output does give some information as to the height of the concentrating power of which the kidney is capable and may reach 1% or more. On the other hand, "if the percentage of salt in the various fractions of urine shows slight changes from hour to hour and does not exceed a maximum value of 0.3% one may conclude a deficiency in the excretory function for salt" (Leo Buerger⁽⁷⁾).

In the same way, if the nitrogen excretion is five to six grammes in twenty-four hours (*id est*, the equivalent of thirty to forty grammes of protein in the food), the patient is taking enough to maintain his health and strength, provided the diet contains a considerable amount of starch in addition. Unless the disease is of such a nature as to demand the restriction of protein food, it is not necessary to limit protein. Lastly, in hot climates and in those who drink insufficient fluid, the total quantity of water eliminated may be very small, resulting in a high fixed specific gravity. It means that additional work is being thrown on the kidneys in concentrating the urea and salts to a high degree in order to rid the body of these substances. The remedy is to prescribe more water.

On the whole the test is a good one, since it affords a comparison of the minimum and maximum values in the specific gravity, water, salt and nitrogen, which is very important in the evaluation of the renal accommodative power, that is, the ability to concentrate and dilute.

In addition, it may furnish us with information as to rational dieting, for, "if a patient can continue his habitual dietary and occupation while carrying out this test, we may then know whether the kidney can handle the customary daily burden imposed on it in a normal fashion or whether it has to put forward an abnormal effort to meet the situation. With such information at hand we are able to judge as to whether the existing regimen of the patient is satisfactory, whether greater liberties are permissible or whether further restrictions are indicated" (Mosenthal).

But it is often difficult to interpret when oedema is present and, besides, the test is admitted by its sponsor to be almost too delicate at times, as has been pointed out. It is a very valuable test for determining the degree of renal involvement in cases of hypertension and to a less extent of distinguishing cardiac from renal conditions. It is surprising it is not more universally used.

The Phenol-Sulphone-Phthalein Test.

The phenol-sulphone-phthalein test, first devised by Geraghty and Rowntree in 1910, is carried out as follows: Twenty to thirty minutes before giving the drug the patient is given a glass of water to insure free secretion of urine. He then empties his bladder or, if there is obstruction, a catheter is passed. The time is noted and exactly one cubic centimetre of the dye solution (containing six milligrammes of the drug) is administered intramuscularly. The urine is then allowed to drain into a

test tube containing a few drops of 25% sodium hydroxide solution and the time of the appearance of the first pink tinge is noted. If a catheter has been passed, this is now withdrawn. The patient is instructed to void urine into one receptacle at the end of one hour and into another at the end of the second hour; when there is obstruction a catheter is passed at these times. Practically in patients with no obstruction the urine may be voided at the end of one hour and ten minutes from the time the drug was injected and again an hour later. If one desires to estimate the efficiency of the kidneys separately, the urine is collected from each ureteric catheter previously placed in two periods of an hour each. Or if, following the teaching of Frank Kidd, it is considered unwise to leave a catheter in the ureter for so long, the time of the first appearance of the dye may simply be noted.

The dye normally appears in eight to twelve minutes when given intramuscularly. From 40% to 60% should be eliminated in the first hour and from 20% to 25% should be eliminated in the second hour, making a total of from 60% to 85% of the drug dose eliminated in two hours.

John D. Comrie, of Edinburgh,⁽⁸⁾ says that the excretion of 50% is compatible with recovery under treatment; 30% is low, but life may be carried on on a low plane of vitality; an excretion of below 20% is bad and if it persists, it means death in a few months.

The percentage eliminated is estimated by treating the urine of the two periods with sufficient strong sodium hydrate solution to bring out its maximum red colour and each specimen diluted to one litre with tap water, if the colour will allow. This is then compared in a colorimeter with a standard containing three milligrammes of the dye to the litre.

In theory the estimation of kidney function by the determination of the ease and speed with which a chemical dye can be eliminated seems somewhat rash, because it would not appear to follow that because a dye-stuff is eliminated with a certain readiness the by-products of metabolism should be excreted similarly by such kidneys. We have seen that some of the latter are not excreted with the same ease as others and possibly their solubility may influence their rate of excretion. Again, may not the liver destroy a variable amount of the dye according to its own functional integrity?

In practice, however, within certain limitations the test has been found by experience to give a fairly accurate idea of kidney function. Still it is not generally conceded that it gives any more reliable information than does a blood analysis and for the following reasons:

Firstly, good excretion means good function, but occasionally hyperfunction may accompany disease and also lead to good excretion. For this reason a total above 75% should be viewed with suspicion and not accepted as final.

Secondly, the drug appears to act as a diuretic in some cases by irritating the kidneys, although a French investigator has maintained recently that an artificial polyuria does not influence the amount of drug eliminated (Tardo⁽⁹⁾). According to this

observer phenol-sulphone-phthalein excretion obeys the same laws as urea excretion, but is not subject to the disturbing factors which complicate the interpretation of the latter, namely, polyuria and a variable concentration of urea in the blood. Since the excretion of either of these substances is not hindered unless there exists a "uræmigenic" lesion of the kidney, he regards it as a most reliable test in the azotæmic type of nephritis.

On the other hand, he says when there is no "uræmigenic" lesion present, the excretion is not only not hindered, but may even be increased, when the lesion present increases the permeability of the kidney, as in simple albuminuria and in the "chlor-uræmigenic" or hydræmic type of nephritis.

Again Comrie⁽¹⁰⁾ considers the test the most satisfactory individual test for prognosis in nephritis and one of considerable prognostic value in cardiac cases. He believes that, if possible, a series of two or three observations should be made at intervals of a few days rather than on one occasion only. In his opinion an accurate idea of the kidney functioning power can be reached by a consideration of the combined results of the blood urea, urea concentration test and the phenol-sulphone-phthalein excretion and that there is a close though not absolute parallelism between urea concentration and the phenol-sulphone-phthalein excretion.

Folin, Fitz, Fotheringham and Denis, from their experimental work on uranium nephritis, conclude that in general blood urea estimations and phenol-sulphone-phthalein excretions run parallel, with this important difference, that the amount of drug excreted shows the kidney function at the moment, whereas the blood analysis is a measure of the accumulating difference between the amount of retention and the amount of excretion. The blood findings give an account of the time element, that is, the duration of the mal-function. Thus the phenol-sulphone-phthalein test gives the kidney function for the moment, while the blood analysis indicates the true grade of the working power of the kidneys. They conclude by saying that in practice a comparison of the two methods has brought out the fact that, especially in urology from the point of view of operative risk, kidney function cannot be estimated without a knowledge of both the phenol-sulphone-phthalein excretion and the blood chemical changes. Further, in prostatic cases especially, after the preliminary cystostomy this test and the urea concentration test can hardly be used as a guide to decide when the kidneys have recovered sufficiently for the patient to withstand the second stage of the operation, because of the difficulty in collecting the urine; the surgeon is forced to fall back on the blood urea or a time test.

Frank Kidd admits the value of the test in no uncertain words and Thomson Walker considers it the best of all colour tests and, except when the urine contains blood or bile, has had no difficulty in estimating the percentage of the dye in the urine, even with the simplest form of colorimeter.

Other observers, notably Addis and Watanabe, have questioned the value of this test in early and even moderately advanced cases of chronic inter-

stitial nephritis, because they hold that the pathological process is not uniformly distributed at first, but involves certain areas more than others, leaving some parts of the parenchyma entirely unaffected, so that slightly diseased or unaffected portions may easily excrete sufficient of the small amount of dye used in the test to give a normal percentage of excretion. Whether this objection applies in other kidney lesions I do not know.

Maclean's Urea Concentration Test.

Maclean's urea concentration test has for its object the testing of the maximum power of the kidneys to concentrate. It depends upon the fact that patients with defective kidneys are incapable of secreting urine with a high concentration of urea and the degree of concentration possible seems to be directly proportional to the functional power of the kidneys.

The kidneys, like the other vital organs, are endowed with more functional tissue than is required to carry on life under ordinary conditions; this amounts to over 50% of the total.

It was in order to estimate this reserve power that Maclean devised his test and it was the desire for a test of renal function which would show earlier involvement than the phenol-sulphone-phthalein test and blood analysis, which would be simpler to perform, both in the method of administration of the test substance and in the estimation of its recovery, which would be simpler and easier to interpret than the two-hour test and not so technical as Ambard's co-efficient, which has made this test so popular.

The administration of fifteen grammes of urea in a glass of water and the estimation of the percentage of urea excreted in the succeeding two hours separately, by the modified hypobromite method, seems to have met this desire. Urea seems uncommonly well adapted as a test substance, because it is a true end-product of protein metabolism, incapable of further change in the body, and a normal excretory product for the kidneys. It is readily absorbed, excreted almost exclusively by the kidneys and may be given in large doses without toxic effects.

The principle of the test, that of subjecting the organ under examination to strain, is a sound one. Moreover, the kidney of early interstitial nephritis, even though it be a patchy condition, is not so likely to be able to deal with such an overload of urea. Thus it should reasonably be expected to disclose early kidney disease.

It is certainly the simplest test to carry out, although the bromine fumes are a little unpleasant at times, and it gives a good general idea of the renal efficiency.

A result of 3.5% or over indicates normal function, over 2.5% that the kidneys are quite efficient to carry out their functions; over 2% indicates a fairly efficient kidney and persistently below 2% in spite of treatment is very unsatisfactory. Persistently below 1% is a sign of impending death.⁽⁸⁾

It is better to take the second hour percentage of urea as the guide, since by this time any diuresis that may have been induced by the dose will have

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passed off. If it has not, a formula suggested by Comrie may be used to correct this, $C = U \times \frac{Q}{150}$, or the test may be repeated next day.

The limitations of the test are that it will not from the nature of things demonstrate a parenchymatous nephritis and in certain cases of mixed chronic nephritis it has failed to demonstrate the renal inefficiency.

Although it is a simple and fairly reliable method of determining renal efficiency, it is not considered ideal, in spite of the many technical and other advantages it possesses.

The consensus of opinion is that it should be employed along with other tests, because a comparative consideration of various methods is more reliable than conclusions based on single tests. Moreover, even the best technicians are not exempt from error and two or more good tests carried out simultaneously give more security than one alone.

CONCLUSIONS.

The conclusions to be drawn are the same for the physician as for the surgeon. They are that the estimation of kidney function is as yet a matter of the computation of a number of factors as furnished by these tests and that these factors must be weighed with the clinical data in the evaluation of a case of kidney disease.

For many years physicians from clinical observation have diagnosed with considerable accuracy the type of pathological changes which were present in the kidneys. Obviously the clinical signs and symptoms have some relationship to the pathological changes and so too have the renal efficiency tests.

Until we have more certain knowledge of the physiology of renal secretion, it will be impossible to correlate completely the pathology with the impaired renal function.

Only repeated application of a number of tests dealing with a large number of persons, combined with careful clinical observation and reliable *post mortem* or operative examinations, can narrow this gap.

Nevertheless, there is no doubt that these tests are an advance and a great assistance in the diagnosis and prognosis of diseases involving the kidneys. They do not do away with the necessity for a routine analysis of the urine, which tells us much about the pathology of the kidneys.

Blood chemical analysis tells us what the blood is storing up, what the kidneys are not doing and also the exact status of the nitrogen metabolism.

The dye tests, in spite of the many objections raised against them, have stood the supreme test of time very favourably.

The two-hour test and urea concentration test are both simple and reliable. The former seems to some extent to fill the breach of the limitations of the latter, namely, its unsuitability in chronic parenchymatous nephritis.

With regard to surgery, operative risk is often largely to be judged by kidney function. It means the ability of the patient to withstand the anæsthetic as well as his ability to carry on the vital functions in the presence of a great change in the

organism caused by the operation. Perhaps in minor operations and in the ordinary short major operations the methods usually carried out (examination of the heart and lungs and testing for albuminuria) are sufficient, but in the department of abdominal and especially urinary surgery, can the same be said? Surely the surgeon who proceeds to operate on the old man candidate for prostatectomy, after having been assured that the blood urea, phenol-sulphone-phthalein and urea concentration tests are fairly satisfactory, will have less cause for fear of unforeseen catastrophes than the one who relies simply on the tests commonly employed in connexion with the urine.

The point that is not sufficiently kept in mind is the fact that kidney disease and kidney function are not synonymous terms. The finding and estimation of the percentage of albumin in the urine and even the presence of casts does not indicate the kidneys' function. The question is not so much whether the kidneys are diseased, but how badly they are diseased. Does their altered function preclude an otherwise justifiable operative risk? In answering this question, let us not forget there is an individual in possession of these organs who must be taken into account also, since possession is nine points of the law.

To be forewarned is to be forearmed. The goal of medicine is to forestall—prophylaxis—the test of science is to forecast—prognose—failing the goal the alternative is to relieve or treat. For treatment to be effective it must be based on a sound diagnosis. Modern medicine demands that the first duty of the medical attendant is to ascertain with exactness the nature of the disease from which his patient is suffering. In order to effect this, we must call to our aid all the means at our disposal. Then why not include renal function tests?

LITERATURE.

Free use has been made of the following: "Practical Chemical Analysis of Blood," by V. C. Myers, 1921; "The Newer Methods of Blood and Urine Chemistry," by Gradwohl and Blaivas, 1920; "Modern Methods in the Diagnosis and Treatment of Renal Disease," by Hugh Maclean, 1921.

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Reports of Cases.

RECOVERY FROM HÆMOPHILIA AFTER OPERATION FOR RUPTURED APPENDIX.

By P. L. HIPSLEY, M.D.,

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Successful operations on hæmophilics are sufficiently rare to justify the report of the following case:

J.F., aged twelve years, was sent to me on February 14, 1923, with a history of having had severe abdominal pain for two days. Examination revealed a distended abdomen with rigidity over the whole of the right half. The pulse-rate was 140 and the temperature 38.9° C. (102° F.). The tongue was thickly coated. The child presented all the symptoms of a ruptured appendix with fairly extensive peritonitis.

Past History.

The child was a typical hæmophilic. I had attended him on numerous occasions since early childhood for hæmorrhage from various situations, such as bleeding from the *frænum linguae* and from minor abrasions, numerous subcutaneous ecchymoses from trivial injuries and on one occasion for hæmorrhage into the knee joint and on another for hæmorrhage into one of the smaller joints of the hand.

Family History.

One cousin on the mother's side died after the extraction of a tooth. The maternal grandfather was a typical hæmophilic, but lived to reach the age of eighty years and then, curiously enough, he died from hæmorrhage after an operation on his turbinates.

Treatment.

Knowing the family and personal history, I decided before operating to secure several suitable donors. Both parents proved after testing by Dr. Tebbutt to be unsuitable, but two satisfactory donors were readily secured.

The operation revealed a ruptured gangrenous appendix, with free pus in the right kidney pouch and in the pelvis. The appendix was removed and the wound drained in the usual way.

For the first six days following the operation the condition of the child was very grave. Morphine was given freely for the first two days and then enemata, preceded by hypodermic injections of pituitrin, were used in an endeavour to reduce the distension, which was marked. Vomiting was excessive and on the fourth day had a faecal odour. However, after gastric lavage and repeated enemata the distension was gradually overcome and the vomiting ceased. The amount of hæmorrhage met with at the operation was rather less than usual. On the sixth day blood began to appear in the stools and on the following day the wound commenced to bleed. The hæmorrhage gradually increased and the child became quite pallid, showing all the signs of severe hæmorrhage. I thereupon decided that transfusion was indicated.

Dr. George Bell and Dr. Holmes & Court transfused half a litre of blood from one of the donors by means of a Kimpton's tube. The condition of the child improved on the table and the bleeding ceased for seven days.

Eight days after the transfusion hæmorrhage from the wound began again and the child rapidly became anæmic once more. I gave the child two hundred cubic centimetres of blood from the same donor as on the first occasion, but the bleeding still continued. Twenty-four hours later I transfused four hundred and fifty cubic centimetres from another donor and the bleeding promptly ceased.

For the next four days a large quantity of old blood clot which had been lying free in the peritoneal cavity came away, but there was no fresh bleeding. There had been no hæmorrhage from the arm incisions up to this time, but

two weeks later one of the incisions, which had failed to heal by first intention, commenced to bleed. This was readily controlled by applying coagulose on a small plug of cotton wool and binding it firmly on to the bleeding point.

The child left the hospital quite well at the end of the sixth week.

Commentary.

There was no excessive hæmorrhage at the time of operation and for a week afterwards.

The duration of the control of hæmorrhage seemed to depend on the quantity of blood transfused.

There seems to be no reason why operations should be particularly dangerous on hæmophilics, provided the surgeon is in a position to do a transfusion promptly if necessary.

Reviews.

THE LIVER.

A NEW book by G. H. Roger, who is Professor of Experimental Pathology in the University of Paris, gives an up-to-date account of the physiology and pathology of the liver.¹ That the author himself has been no mean contributor to the progress of knowledge of this subject is shown in an appendix which contains a list of eighty-two works on various aspects of the functions of the liver in health and disease written by the author during the last thirty-six years.

After a brief summary of the human and comparative anatomy of the organ, chapters are devoted to detailed descriptions of the varied functions of the liver, both normal and pathological. A broad view of the scope of the chapter heading is taken; for instance, the section on the glycogenic function of the liver includes a discussion of the blood sugar in normal conditions and the whole subject of hyperglycæmia and glycosuria.

The secretion of bile, jaundice, the function of the liver in the digestion and metabolism of carbohydrates, fats and proteins, the action of the liver on poisons and bacteria and the experimental pathology of the organ are fully dealt with in successive chapters and the more important applications to medical and surgical practice are constantly kept in view.

Clinicians will turn naturally with greatest interest to the chapter on the investigation of the functional capacity of the liver. After a short description of the signs to be sought by physical examination of the patient, the various bio-chemical tests are reviewed and their value in diagnosis assessed. The methods by observation of bile pigments and urobilin in the urine, of the excretion in the urine of sugars introduced by the mouth or subcutaneously, of the excretion of glycuronic acid in the urine after the ingestion of camphor, of the excretion of alkaloids (quinine) or dyes (methylene blue), of the toxicity of the urine injected intravenously into rabbits, of the amino-acid content of the urine and of the hæmoclastic reaction of Widal are detailed. None of them is regarded as of predominant value.

The book is written with all the lucidity of the best traditions of French medicine. There is no index, but with the help of the table of contents and numerous cross-headings, information on any point required can be found. Apart from the bibliography of the author's own works, there are no references given to the authorities quoted. These are nearly all French.

The book will serve as a useful work of reference to all who require a clear and full statement of the present-day knowledge of the functions of the liver under normal and pathological conditions.

¹ "Physiologie Normale et Pathologique du Foie," par le Docteur G. H. Roger; 1922. Paris: Masson et Cie; Royal 8vo., pp. 400, with 16 figures. Price: Frs. 22 net.

The Medical Journal of Australia

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Clinical Pathology.

THE general practitioner does not take full advantage of the laboratory aids to diagnosis. He, like his predecessor of a generation ago, finds that a working diagnosis can usually be made as a result of physical examination and a consideration of the history of the illness and he is satisfied to apply treatment on the basis of this diagnosis. If the treatment fails to effect a cure or improvement, he revises the diagnosis and essays another remedy. Moreover, he is usually content with a diagnosis which gives a name to the affection, but which does not include the visualization of an exact picture of the changes existing in the various tissues and organs of the body. It must be admitted that the practitioner who rarely has an opportunity of studying the *post mortem* appearance of the affected parts, of examining microscopical sections of these affected organs and of coordinating the clinical signs and symptoms with the pathological evidence, can scarcely be expected to think in terms of pathology after a succession of years of practice. He is, nevertheless, remiss because he does not avail himself of modern methods of clinical pathology as aids to diagnosis and prognosis. It is in the interests of his patient that he should not rely solely on his clinical ability and it is detrimental to medical progress that he, as a unit of his profession, should not record with meticulous exactness every unusual manifestation of disease and every experience differing from accepted doctrines. Facilities are now being offered to the practitioner for having many of these aids carried out for him, while even the patient at times is aware of their value and demands their application.

Clinical pathology in its widest meaning includes chemical, bacteriological, biological, physical and histological investigations. For example, the urine of every patient should be examined not merely for

albumin, sugar and blood, but for its physical condition, for the quantitative estimation of some of its normal constituents and for some abnormal contents. In general practice the tests of the renal function are often applied as a last resort, after valuable time has been wasted. Again, many ill-defined illnesses associated with disturbances of digestion and metabolism would be better understood if variations of the reaction of the urine were carefully registered and the findings coordinated with the excretion curves of the chlorides, phosphates and other ingredients of urine. The blood, too, should be examined very frequently, even if there be little clinical evidence of a gross anæmia. Some of this work can be conducted by the practitioner in a simply equipped laboratory. It needs knowledge that is within the grasp of every modern practitioner and some technical skill which he can acquire without great difficulty. Some of the urine and blood investigations must be carried out by an expert in laboratory work, since it demands special training and constant practice to insure accuracy.

Similarly in bacteriological and biological work, the general practitioner may find time and be possessed of ability to undertake some of the simpler examinations, but he is largely dependent on the laboratory worker for the more complex investigations. Every medical practitioner should be able to prepare a sputum slide and to recognize tubercle bacilli and a few other characteristic bacteria. He would be unwise to rely on his own judgement concerning a pneumococcus, since it is advisable to continue the study of this organism until the type is determined. He certainly needs no help in applying the von Pirquet test, but it would be absurd were he to endeavour to perform the Wassermann or Widal test unless he had been engaged in this kind of laboratory work for a considerable time and had opportunities for carrying them out at frequent intervals. In seeking guidance from the histological appearances of a portion of a growth removed for diagnostic purposes, few general practitioners would care to place reliance on their own, uncorroborated opinion. Nevertheless, they would derive benefit if they could cut a section and prepare a slide for their own study, while they submitted another specimen to the pathological laboratory.

Clinical pathology has become more complicated, more extensive and more difficult in the course of the past few years. Its dicta are becoming increasingly valuable, provided that the investigations are efficiently done. Under the most ideal circumstances, the clinical pathologist should be regarded as a consultant, who should be given the advantage of seeing the patient, of carrying out a physical examination, of learning all that can be evinced of the family and past history and of the course of events leading to the manifestation of the existing illness. Unfortunately, distance and other circumstances often combine to render this course impossible under ordinary circumstances in Australia. In the chief cities, it is true, a real consultation between the attending practitioner and the clinical pathologist can be arranged, but not so in the majority of the country districts. When a consultation cannot be held, the general practitioner should take the pathologist into his confidence and provide him with all the available information, so that the difficult task the latter has to perform may be fruitful and the assistance he renders may be the more valuable. At times the patient may be able to visit the laboratory. But if this be impossible, it may be wise for the general practitioner to submit a record to the pathologist and for the latter to suggest what investigations should be carried out and how the specimens should be collected and transmitted to the laboratory.

In view of the undoubted importance of this kind of investigation of the changes in the chemistry, biology, physics and structure of tissues and organs of the body in disease, better provision should be made for their performance. The departmental laboratories in the several States offer facilities of considerable value, but since no fee is charged for this work, these laboratories should not be used for patients able to pay. The Commonwealth clinical laboratories will, no doubt, prove a boon to practitioners living and practising outside the metropolitan areas, but here again service is offered free of charge and in consequence it is for the benefit only of lodge patients, of persons of small means and of the indigent. In the great cities a few practitioners have taken up clinical pathology as a specialty and offer to their colleagues assistance which

is imperative if an accurate diagnosis is to be made. More pathologists in private practice are needed. Some should select the larger centres outside the greater cities. That the work can be remunerative is evident, provided that the general practitioner will recognize the gain both he and his patients may derive from it. It may confidently be anticipated that men and women pathologists choosing this life would find their time fully occupied and their energies amply requited. It is held by many that laboratory work lacks fascination for the majority of medical practitioners because of the absence of opportunity to come into contact with patients. As has been indicated above, this divorce is undesirable and regrettable. Constant demand and reiterated insistence will gradually break down the barrier which now stands between the clinical pathologist and the patient. Within a short time the reasonableness of the claim of the clinical pathologist to be regarded as a consultant will receive recognition and the one valid objection to the adoption of this specialty will disappear.

The work can be strongly commended to those who by natural aptitude and special training are likely to become expert.

Current Comment.

STABILIZING OPERATIONS ON THE FEET.

In the condition commonly referred to as flail foot muscular control has been destroyed and the wide range of movement which is present, really takes place at three joints, namely, the ankle joint, the sub-astragaloid joint and the astragalo-scapoid joint. In endeavouring to rectify this the surgeon must aim at several things. The primary consideration must be the production of stability of such a nature that the foot will bear the weight of the patient without turning laterally in the long axis of the foot. This is the most difficult part of the problem. The end result should be so planned that the patient will use the whole of the sole when walking and not merely the heel. Walking without artificial supports should be possible. The skilful surgeon will also pay attention to the appearance of the foot so that it will approximate the normal condition as nearly as possible. Many procedures have been adopted in turn and each method has had its advocates.

In 1921 a commission was appointed by the American Orthopaedic Association to report on the value of the various stabilizing operations on the

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feet. The members of the commission were Dr. Ansel S. Cook, of Hartford, Dr. Walter G. Stern, of Cleveland, and Dr. Edwin W. Ryerson, of Chicago. The method adopted by the commission consisted in visiting various orthopaedic clinics, witnessing operations and examining the feet of patients. In this manner the condition of some two hundred and fifty patients was investigated in regard to flail foot. A report of the findings of the commission has been published.¹ A flail foot is described in the report as a foot in which the muscles are so completely paralysed as to be unable to control the motions of the joints, a foot which is unserviceable and often painful. The commission found that a flail foot could be converted by certain procedures resulting in ankylosis into a useful and painless foot. They point out that if the ankylosis takes place in a position of even modest calcaneus, the patient will be a heel walker and will always limp. Although the foot will be of a certain amount of use to the patient in this position, much better results will be obtained if the foot is placed at the time of operation in a position of slight equinus. The patient in such a case can use the heel and ball of his foot when walking. The limp might possibly be entirely eliminated by this means. A rigid ankylosed foot is not as useful as one in which a limited amount of ankle movement is possible. The members of the commission point out that the foot can be so treated that the ankle joint is controlled by bone balance independently of muscular action. This can be achieved either by the transverse horizontal section devised by Davis, in which no bone is removed, or by the open operation preferred by Hibbs, in which superfluous bone is removed. They also refer to astragalectomy as practised by Whitman. In this operation, and indeed in that of Davis and Hibbs, the foot is displaced backwards on the tibia and fibula. This backward displacement of the foot is absolutely essential to the successful issue of the operation, in addition to a moderate equinus position. The members of the commission concluded that Whitman's operation, when performed on suitable subjects, gave the best results. Next in order of preference they placed the open operation of Hibbs, while that of Davis they placed third. They also state that patients with active calf muscles are not suitable subjects for the operation of astragalectomy or transverse horizontal section. They have made no mention of the operation described by Hoke. In this operation he left the ankle joint intact and performed arthrodesis of the astragalo-scaphoid joint and of the sub-astragaloid joint. The results reported from this operation were of a very satisfactory nature. More than this, they make no mention whatever of the work of British surgeons, such as Naughton Dunn, in this regard. The operation as planned by Naughton Dunn consists in arthrodesis of the sub-astragaloid joint and the removal of various portions of bone from the tarsus. In this way the function of the ankle joint is retained. Plantar flexion is fortified by transplantation of the muscles passing to the sole into the *tendo Achillis*. Sir Robert Jones, in the course of

an address before the Royal Society of Medicine in 1922, stated that he had seen fifty patients on whom this operation had been performed, and that the results had been excellent. In view of the somewhat restricted field of their inquiries, it would appear that the findings of the commission cannot be accepted as final in regard to these operations.

The members of the commission point out that there is a condition which has the appearance of an equinus or cavus deformity, but which is really caused by flexion of the fore part of the foot. Division of the *tendo Achillis* really results in a surgical disaster. The correct treatment consists in the excision of a wedge of bone from the dorsum of the foot. The wedge includes the greater part of the head of the astragalus and the posterior articulating surface of the scaphoid.

The members of the commission found that the vast majority of the patients whom they examined, had at one time or another been subjected to tenotomy or tendon transplantation. A bone-cutting operation had been the fate of all of them. They then ask whether it would not have been better to have performed the bone-cutting operation at the outset. They realized that this criticism was perhaps not a fair one, because they had only seen those patients in whom operations on the tendons had not been of any material advantage. The scope of their inquiry was therefore extended to include a study of the problem of partial and total paralysis of the dorsiflexors of the foot.

In this connexion they studied the various methods of alleviating the condition. They conclude that arthrodesis of the ankle joint usually fails to produce ankylosis if performed before the age of fourteen years. Most of the patients who had undergone the operation, were dissatisfied with the result, though stabilization had unquestionably been obtained. Suspension by means of silk ligature was found to have produced some good results. It is not advisable, however, in patients under fifteen years of age. It was found that some satisfactory results could be obtained by fastening tendons to the tibia. The members of the commission came to the conclusion that there was a distinct field of usefulness for this type of operation. Suspension of the foot by strips of fascia was not found to be a satisfactory method of treatment, while the excision of a diamond-shaped piece of skin or a skin-bone flap from the front of the ankle joint was of temporary benefit only. The results of astragalectomy were sufficiently satisfactory to warrant the adoption of this operation in selected instances. The conclusion was formed that no type of operation could be recommended as a standard procedure. Lateral deformities of the feet are far more disabling than foot-drop. The majority of patients with simple foot-drop were found to be quite comfortable while wearing some form of foot brace. A recommendation is added that tendon transplantation should be almost universally supplemented by stabilization of as many of the smaller joints of the foot as are necessary to correct any tendency to subsequent varus or valgus deformity.

¹ The Journal of Bone and Joint Surgery, January, 1923.

Abstracts from Current Medical Literature.

MORPHOLOGY.

Thoracico-Lumbar Vertebrae in Mammalia.

T. WINGATE TODD (*The Anatomical Record*, December 20, 1922) suggests a study of the numerical significance of the thoracico-lumbar vertebrae in the mammalia. His conclusions are largely based on statistical studies from the series of skeletons in the museum at the Royal College of Surgeons and on the collection which he secured at Western Reserve University, Cleveland, Ohio. Since the number of cervical vertebrae is almost constant in mammals, the question resolved itself into the modal number of thoracico-lumbar vertebrae in the primates, the stability shown by this number and the steps by which it was obtained. The primitive mammalian number is probably nineteen or twenty. Owen was apparently the first observer who saw clearly that there was a continuous reduction throughout the primates until the anthropoids and man are reached and that this commenced at the other end with the *carnivora*, in whom the number is twenty. In the monotremes and marsupials the number—nineteen—seems very constant. In other mammalian orders, the *rodentia* and less specialized forms of *insectivora* tend to retain the number nineteen, while the *ungulata* show a tendency to increase. The latter form what Welcker called auxispondylous types, while the types with reduction he termed lipospondylous. Turning next to the lemurs, the lowest of the primates, we find the more unspecialized forms retaining the number nineteen, while the more aberrant forms usually tend to increase this number; one form, however, *myosicebus*, with ape-like tendencies, has only eighteen thoracico-lumbar vertebrae. The new world apes and the old world apes are also considered, the latter showing an extraordinary stability, in that thirty-five out of thirty-eight skeletons had nineteen thoracico-lumbar vertebrae; in the remaining three the number was reduced to eighteen. Turning now to the anthropoid apes and man, we find that the gibbon has eighteen as its normal number, but this number is unstable and tends to be reduced to seventeen. The gorilla is still more unstable; the number is often reduced below its normal, seventeen. The chimpanzee is also unstable about its normal number of seventeen. Man shows an extraordinary stability, in that of seven hundred and forty-eight skeletons, seven hundred and seventeen showed the normal number of seventeen, while any instability was largely in the direction of increase to eighteen. Finally, the *crans* is again fairly unstable in regard to its normal number of sixteen. In discussing the human thoracico-lumbar vertebrae a more accurate estimate was made by

taking into consideration transitional forms and the following figures were obtained. Five specimens had only sixteen vertebrae; thirty-five showed a transition from sixteen to seventeen thoracico-lumbar vertebrae; six hundred and sixty-seven were normal; fifteen showed a transition from seventeen to eighteen, while in twenty-six instances eighteen thoracico-lumbar vertebrae were present.

Human Types and Growth Reactions.

C. R. STOCKARD (*The American Journal of Anatomy*, January 15, 1923) extends his previous work on the significance of the influence of modifications in the rate of development on embryonic structure, to problems of post-natal growth. From the evidence afforded by extreme structural peculiarities, such as the dwarf and giant, an attempt is made to determine the factors concerned in regulating the more usual human types. The cretin is an individual abnormal from causes directly attributable to the thyroid. Cretinism is an arrested child stage. This fact is fully borne out by experiments which show that the thyroid is essential for the metamorphosis of amphibian larvae. The similarity between the small African pigmies and the cretin strongly suggest that they are a race of partial cretins in which the condition is inherited from one generation to the other. Of other types of dwarf, the condition of achondroplasia has been attributed by some to a "minus thyroid" condition, by others to the pituitary. Both in man and animals there are two main types, exemplified in the *Dachshund* type and bulldog type—why the "dish face" of the bulldog type should be absent in the *Dachshund* type and why the condition is sometimes limited to one bone is not clear. Both in the human and dog types there are many points in common and the author believes that by the artificial selection of achondroplastic dogs man has made more or less pure achondroplastic types in the *Dachshund* and bulldog and the condition is transmitted to their offspring, probably by an inherited modification of a gland of growth—in this case the pituitary. The author conceives that a peculiarly acting gland of internal secretion may be inherited and that this possibly causes the strange structural types seen. Considering the extreme variations of normal form—the ateliotic dwarf and the giant—it is found that many of the dwarfs show some sign of achondroplasia, whilst many human giants present some degree of acromegaly. Both of these opposite conditions are due to disturbed conditions of the pituitary, which appears to hold the balance of growth—a variation one way or the other determining growth in favour of the giant or the dwarf. That sudden acute structural changes can follow interference with the glands of internal secretion is strikingly illustrated by experiments on the golden sea-knight bantam, in which the plumage of the cock is exactly like that of the hen. If the cock is castrated, at the next moulting he develops the

fine plumage of the rooster, with plume-like hackles, saddle feathers *et cetera*. It has been shown that the strange gland condition which underlies the peculiar plumage of these birds, is definitely inherited. In the same way in man a hair growth reaction takes place in conjunction with the gradual degeneration of the generative organs and more hairs appear on parts which in youth were not so hairy. At the same time he becomes obese. The latter is particularly noticeable in women at the menopause and castrated animals. Thus all normal human beings experience developmental and growth changes due to the usual fluctuations in function of the organs of internal secretion and this is influenced by the amount and quality of the secretions that have been inherited. The author refers to an earlier study of development in which he stated that there was a tendency first to attain length and then width. There is a certain amount of competition between the two, so that the growth in width only expresses itself after the length growth has worn itself down. The organ which appears pre-eminently to be able to affect this growth rate, is the thyroid. Dependent on a high or low rate of activity of the thyroid, all ordinary persons can be classified into two groups which merge into one another. These are the linear and lateral types respectively. The former is the faster growing, high metabolizing, thin but not necessarily tall group, the latter stockier and rounder in form. Just as in the sea-knight bantam the hereditary type may be transmitted, but the expression or development of it depends on numerous environmental influences; in the same way the human types are modified and changed by environment. Although possessing a closely similar ancestry, the upper class Englishmen tend to be of the linear type, whilst the Germans are of the lateral type. This is explained by the influence of environment. Linear types are usually found along the coast, where there is a good supply of iodine in the environment and where the thyroid is active or hyperactive. Individuals of the lateral type live inland, away from the iodine supply of the sea. Data are quoted to show that lateral type immigrants from the centre of Europe, after several generations in the maritime environment of New York, tend to change to the linear type. If these two types exist, it is incorrect to try to obtain an average proportional figure by averaging a large number of physical measurements, as was done in America over a great number of men in the American forces. The author claims that the statue made on these figures, to represent the average young American, presents a number of abnormal proportions and the result of the melting together of these measurements is a figure which would rarely be seen. The growth rate of the individual depends upon both internal and external factors, hereditary composition and functional activities, the latter being modified largely by surrounding conditions.

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MORBID ANATOMY.

Endometrioma and Endometrio-Myoma of the Ovary.

W. BLAIR BELL. (*The Journal of Obstetrics and Gynaecology of the British Empire*, Autumn Number, 1922) states that many examples of the so-called adeno-myomata and adeno-fibro-myomata of the recto-vaginal septum, utero-sacral, round and ovarian ligaments and, indeed, a few of the Fallopian tubes, the sigmoid colon, the umbilicus and the rectus muscle have been recorded. These extra-uterine growths have been described as adeno-myomata and adeno-fibro-myomata no less wrongly than in the case of similar neoplasms which occur very often in the uterus. The author calls these tumours endometrio-myomata and endometrio-fibro-myomata because functional endometrium, not merely glandular tissue, is always found in these tumours during the reproductive period. Further, he draws attention to the fact that the so-called perforating chocolate cysts of the ovary, whether occurring in association with endometrio-myomata of the uterus or independently, usually contain menstrual fluid discharged by endometrium in the ovary. Endometrio-myomata in the uterus are easy to explain developmentally, as are those which are found in the recto-vaginal space and in the utero-sacral, round and ovarian ligaments, owing to the fact that the essential uterine tissue—endometrium—is enclosed in muscle bundles derived from the muscle sheet that forms the external coat of the uterus. It is, however, not so easy to understand how independent endometrio-myomata of the umbilicus and ovaries arise. Sampson inclines to the view that tissue of an endometrial type arises in the ovary as a result of metaplasia of inclusions of capsular epithelium, or of luteum epithelium. The author, however, adheres to the view that the appearance of a functional structure, such as endometrium, in abnormal situations can only result from congenital aberration when not due to direct contact; and this is easily possible in the case of inclusions of endometrium by way of the ovarian ligament, or even by intermixture of Müllerian and ovarian elements in the intermediate cell mass at an early stage of development.

Pigmented Fatty Change.

E. EMERY-ROBERTS and H. A. HAIG (*The Journal of Pathology and Bacteriology*, January, 1923) have studied a further stage in fatty change occurring in cell degeneration, resulting in the production of deeply pigmented bodies. It has long been recognized that the fatty or lipoidal globules occurring in cells undergoing degenerative changes may leave the damaged cells and appear in the surrounding tissues, where they may become ingested by large mononuclear leucocytes. It is generally assumed that, if the damage to the cells is not excessive, the latter are capable of utilizing the globules. In this paper the authors demonstrate a further stage

in the fatty change, resulting in the formation of deeply-pigmented bodies. This stage is not of uncommon occurrence and has been noted in certain instances of sub-acute septicæmia and toxæmia. It has not been detected in all conditions of toxæmia and septicæmia, nor is it present in such instances of pernicious anæmia and acute yellow atrophy of the liver as have been investigated. The process, when it occurs, is well seen in the kidneys, myocardium and liver and consists essentially in an alteration in the constitution of the fatty or lipoidal globules, whereby a progressive loss of the fatty or lipoidal contents is accompanied by a gradual deposition of pigment at the peripheries or margins of the affected globules. A shrinkage process follows, resulting eventually in the formation of minute deeply-pigmented spheroidal granules. The authors' attention was first drawn to the characteristic appearances whilst they were examining material from a case of fulminating diphtheria in a boy six years of age. They have since noticed identical appearances in material from patients with puerperal septicæmia, amebic abscess of the liver, congenital syphilitic liver and nutmeg liver and from patients in whom intra-uterine death of a fetus has occurred at eight and a half months. In every instance in which these bodies occurred intra-cellularly, a fatty or lipoidal change had pre-existed in the cells concerned. Unquestionably intermediary stages were demonstrable between the bodies and the fatty or lipoidal globules in the affected cells. The derivation of the bodies from pre-existing fatty or lipoidal globules points to the lipo-chromatic origin of both the pigment and the bodies themselves, since neither can be dissociated from the other. It can be shown that the progressive loss of the fatty or lipoidal contents of the globules is accompanied by changes in the lipo-chrome. The first change observed is a darkening of the affected globules. The next change is the appearance of a greenish tint. The final change is the development of the characteristic brown-black bodies, which thus appear to be composed of altered lipo-chrome. The altered lipo-chrome is a product possessing none of the attributes of an unaltered lipo-chrome. It is a new substance, possibly a lipo-chromatic reduction product.

Gastric Glands in the Vitelline Duct.

G. W. NICHOLSON (*Journal of Pathology and Bacteriology*, April, 1922) says that ever since Cohnheim advanced his theory of "embryonic cell rests" as an explanation of tumour formation, many pathologists regard the presence of a tissue at a spot in which it is not usually found, as evidence of a displacement during development. They rarely consider the possibility that it has originated in the cells of the part. He records a case of a patent vitelline duct, whose distal end was evaginated in the usual manner. The part of the vitelline duct within the abdomen was lined by a mucus membrane identical with that

of the small intestine. Where it was evaginated on to the surface it possessed a gastric mucosa. There are two possible explanations of the presence of gastric glands at the distal end of the vitelline duct—displacement and heteromorphosis. The author adopts the latter. Cells of the ectoderm are able to undergo differentiation in two directions, the alternatives being squamous and columnar epithelium, both of which are normally present in the alimentary canal of the adult. If hyper-nephromata, whose origin from accessory supra-renal bodies is open to question, and some other analogous neoplasms are excluded, it is surprising how few malignant blastomata there are whose structure is incapable of any other explanation than that they have arisen in cells that were displaced during development. The histogenesis of many heterotropic neoplasm, such as squamous-celled carcinomata of internal organs, can be explained on totally different lines, if the possibility of an abnormal differentiation of the cells of a part is admitted. The author believes that congenital dislocations of tissue are predisposed to malignant blastomatous proliferation to precisely the same extent as cells whose development has been perfectly normal.

Primary Carcinoma of the Lung.

H. J. C. GIBSON and G. M. FINDLAY (*The Lancet*, January 6, 1923) report an instance of primary carcinoma of the lung. They point out that squamous metaplasia of the bronchial mucosa is a not uncommon occurrence in tuberculosis and other pulmonary lesions. As a result a certain number of carcinomata arising from the bronchial mucous membrane are definitely squamous in type. In a few instances there is a mixture of squamous and columnar cells in the primary tumour, showing that metaplasia may take place in the established tumour. In the instance reported by the author, although there was a preceding tuberculous lesion, there was no evidence of cell metaplasia in the primary lung tumour. Such a metaplasia was, however, well seen in certain of the metastases, notably those of the voluntary muscles and skin.

Adeno-Myoma of the Recto-Vaginal Space.

ARCHIBALD DONALD (*The Journal of Obstetrics and Gynaecology of the British Empire*, Autumn Number, 1922) has recorded ten instances of adeno-myoma of the recto-vaginal space, seven of which were associated with cystic ovarian tumours containing tarry or chocolate coloured contents. The cysts are nearly always bilateral, generally very adherent and frequently have to be dug out of the broad ligament or side and back of the pelvic cavity. They seem to have the faculty of burrowing into tissues and of contracting very firm adhesions. The author formed the opinion on clinical grounds that the cystic tumours were adeno-myomata and this has recently been confirmed by the pathologists.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE QUEENSLAND BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held on April 6, 1923, at the B.M.A. Building, Adelaide Street, Brisbane, Dr. D. A. CAMERON, the President, in the chair.

The Late Charles Timon Lane.

A vote of condolence was passed to the relatives of the late Dr. C. T. Lane.

Skiagrams.

Dr. A. J. REYE exhibited a skiagram of a fracture involving the arches of the second and third cervical vertebrae. The patient was a young girl. She had been thrown out of a sulky and had fallen on her head. The only symptom had been much pain in her neck. There had been no displacement of the bodies of the vertebrae. She had been kept in bed with pillows on both sides of her neck. Plaster had not been used because there had been no tendency to displacement.

Renal Disease.

Dr. S. F. McDONALD read a paper entitled "Albuminuria in Young People" (see page 571).

Dr. M. GRAHAM SUTTON read a paper entitled "Renal Efficiency Tests" (see page 574).

Dr. A. JEFFERIS TURNER stated that, in spite of the probable value of the renal efficiency tests, their ignorance was still great. It was well to remember that the kidneys as filters had an enormous reserve power, comparable to that of the heart and lungs. Analysis of the urine was worth the trouble. It was frequently difficult to foretell whether a leak was serious or not. Albumin in the urine in itself was not of very great importance. It was frequently passed after strenuous exercise. He considered that persons with orthostatic albuminuria should be regarded as "first-class lives." Casts should be noted with suspicion. A high blood pressure and cardiac hypertrophy were bad signs. In the late stages high blood pressure was associated with albuminuria. The absence of high blood pressure did not justify a good prognosis. In these circumstances the renal efficiency tests might be of considerable importance. At present they had no means of ascertaining for certain whether constant albuminuria uncorroborated by other signs meant nothing or a progressive decline. He agreed with Dr. McDonald in regard to treatment that there was no use for energetic measures except for uræmia.

Dr. ELLEN KENT HUGHES asked if iron should be given to patients with interstitial nephritis, as they all seemed to be very anæmic. She also asked for an expression of opinion regarding the advisability of future pregnancies after an attack of eclampsia.

Dr. W. N. ROBERTSON, C.B.E., was disappointed that no mention had been made of the removal of toxic infective foci, such as the tonsils or teeth, when Dr. McDonald dealt with the causes of albuminuria in young people. He quoted several instances in which the albuminuria had disappeared after the removal of such foci.

Dr. McDONALD thanked the members for the reception of his paper. He stated that no efficiency tests would help in the diagnosis of early lesions. When a renal lesion was diagnosed by means of any of the tests in use at present, the condition was beyond curative treatment. He hoped that Maclean would devise a test to overcome this difficulty. He asked if any members knew of the value of infusions of couch grass. In reply to Dr. Ellen Kent Hughes, he stated that he would watch the pregnancy and if no albuminuria was noted, regular blood pressure readings should be taken. A blood pressure above one hundred and fifty millimetres of mercury should be considered a matter of grave concern. The administration of iron did not improve patients between the attacks; general hygienic measures were better. He agreed with Dr. Robertson that a search should be made for infective foci and if any were found, they should be removed, if possible.

Dr. SUTTON thought that the urea concentration test might be of value in arriving at a prognosis in eclampsia. Many persons with relapsing acute nephritis, finally ending in chronic parenchymatous and interstitial nephritis, had some focal infection. If the focus were removed before too many shower emboli reached the kidneys, good results would ensue.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held in conjunction with the Melbourne Pædiatric Society at the Children's Hospital, Carlton, on April 11, 1922, the President, Dr. L. S. LATHAM, in the chair.

A large number of patients suffering from a variety of conditions was assembled by the Registrar of the Hospital, Dr. J. W. GRIEVE, and demonstrations were conducted by members of the honorary staff.

Cardio-Spasm.

Dr. R. L. FORSYTH presented a female child, aged two years and two months, to illustrate the condition of cardio-spasm. She had been breast-fed until she was fifteen months old and it was stated by her mother that she had always been subject to attacks of vomiting and associated constipation. A severe attack of several days' duration had been the immediate cause of her admission to hospital in December, 1922, when her weight was recorded as 6.8 kilograms.

By the passage of bougies and radiographic examination obstruction at the cardiac end of the stomach had been demonstrated. At first the child had vomited practically all feedings, but subsequently had improved to a degree which permitted of the retention of fluid feedings and rejection of thickened cereals only. Periodically, however, all food had been rejected for several days.

Œsophagoscopy had disclosed hypertrophy of the muscle and narrowing of the cardiac orifice of the stomach, a condition analogous to the more commonly occurring hypertrophic stenosis of the pylorus.

Relief of symptoms at the time of demonstration was maintained by the passage of bougies at intervals. The child's weight was 8.2 kilograms.

Congenital Syphilis and Hodgkin's Disease.

Dr. FORSYTH's second patient was a boy, aged six years, who had suffered from glandular swelling in the right side of the neck for a period of twelve months. The glands had been discrete from the time of their first appearance and from time to time had been observed to vary in size.

Inquiry into the family history had yielded strong evidence of luetic taint, confirmed by positive serological findings in the serum of the boy's mother. The serum of a brother, an idiot, had also reacted to the Wassermann test.

The blood of the patient had given an unequivocal positive reaction to the complement fixation test for syphilis and treatment had been instituted with "Nov-arseno-billon," mercury and iodide of potassium, with results which on the whole were to be considered disappointing.

Other investigations carried out in the case of this boy had consisted in the application of the cutaneous (von Pirquet) and subcutaneous tuberculin tests, examination of the blood and histological examination of an excised gland. The tests with reference to tuberculosis had failed to produce a reaction and the red and white cell counts had shown no departure from the normal, while a differential leucocyte count had disclosed a polymorpho-nuclear leucocytosis and an eosinophilia of 5%.

In a report on the excised gland the pathologist had found some difficulty in coming to a decision as between congenital syphilis and Hodgkin's disease. The presence of extreme endothelial activity and advanced fibrosis had suggested syphilis, but on the other hand the eosinophile cells characteristic of Hodgkin's disease had been much in evidence. He had regarded the section as most probably indicative of the more chronic type of Hodgkin's disease.

Rheumatoid Arthritis.

Dr. FORSYTH's third patient, a boy, aged five years, provided an instance of intractable rheumatoid arthritis. The child's illness was of five years' standing and on the

DR. DOWNES'S PATIENT WITH HÆMOPHILIA

readings were consistently between one hundred and fifty and two hundred millimetres of mercury. The urine had been regularly found to contain albumin and hyalo-granular casts. Renal function as determined by the urea concentration test had been deficient in that the urea percentage in the urine passed at the end of the second hour after the ingestion of urea had been 1.4 only.

By ophthalmoscopic examination definite optic neuritis had been observed in the left eye and a small hæmorrhage along the upper temporal vein had also been noted.

No reaction had been obtained on submitting the blood serum to the Wassermann test.

The boy had been discharged from hospital and during the several months which had elapsed before his re-admission in April, 1923, he had had two fits. His urine was albuminous, but no casts could be detected. The systolic blood pressure still stood at one hundred and eighty millimetres of mercury.

Rheumatic Carditis.

Dr. HOON also presented three children affected with rheumatic carditis. The first, a boy, aged thirteen years, had been well until October, 1919, when he had developed acute rheumatism, accompanied by præcordial pain, dyspnoea and vomiting. After a period of treatment with salicylates and digitalis, during which he had improved very much, tonsillectomy had been performed. Although presenting evidence of aortic and mitral endocarditis, the boy had been able to run about with but little embarrassment and had been consequently discharged from hospital.

In February, 1923, he had returned with a recurrence of præcordial pain, accompanied by rigors, sweats and dyspnoea.

Dr. HOOD discussed the treatment and prognosis in two other patients with rheumatic carditis and afforded opportunity for physical examination.

Cretinism.

Dr. W. W. McLAREN showed as an example of cretinism a girl, aged seven years. She had been reported as well until she had contracted influenza three years previously. Since that time she had not grown and had become dull, phlegmatic and stouter. She was slow of speech and displayed a tendency to protrude the tongue; the skin was dry and the hair harsh. The girl had always lived in the city; her weight was 14.5 kilograms and her height 62.5 centimetres. Her eldest sister, aged seventeen years, was affected with goitre, but five others of the family were in good health. Thyroid treatment had been instituted on March 8, 1923.

Post-Influenzal Pneumonia with Antral Disease.

Dr. McLAREN also showed a girl, aged seven years, who had become ill with influenza upon which had supervened right basal pneumonia in September, 1922. Physical signs in the chest had persisted ever since and the child had not regained her normal health. The left nostril discharged copiously at frequent intervals. Vaccine therapy had been tried unsuccessfully and the child was now awaiting a radical operation on her antrum.

Infective Colitis.

Dr. STEWART W. FERGUSON discussed the question of infective colitis in infancy and illustrated his remarks by the exhibition of a number of thermic, diet, stool and weight charts of infants in the Baby Ward.

Talipes.

Mr. W. KENT HUGHES exhibited a number of lantern slides and photographs from which he demonstrated principles and results in the treatment of various forms of talipes.

He also based some remarks on antral disease in children upon the case of a girl upon whom he had operated for this condition, and showed skiagrams illustrating antral suppuration.

Tuberculous Spinal Caries.

Mr. KENT HUGHES further showed three children whom he had under treatment for tuberculous spinal caries.

The first was a boy, aged four years, who had been first

admitted to the Children's Hospital in March, 1922. At this time he had exhibited kyphosis, said to have been present for eighteen months. He had been treated for some months by means of a double Thomas's splint with head extension. By radiographic examination the first and second lumbar vertebrae had been found to be in a condition of advanced caries and a lumbar abscess had been evident to clinical examination. After aspiration of the abscess the child had been placed in a "Bradford" frame; the abscess, however, had ruptured and at the end of May, 1922, the cavity had been opened freely, thoroughly cleaned and closed. At the same time the Albee operation of bone-grafting had been performed. Following the operation the child was given an anterior Thomas's splint and subsequent treatment by helio-therapy.

The clinical history of the second child, a girl, aged nine years, was that she had suffered pains in the back for a period of nine months. Positive reactions to both human and bovine tuberculins had attended the application of the von Pirquet cutaneous test. It had been ascertained that the girl's sister had been treated for tuberculous spinal caries five years previously. A report of "partial reaction" had been received when the blood was sent for the Wassermann test. Treatment, consisting of the application of an anterior Thomas's splint and helio-therapy, had been in progress since January, 1923.

The third child, aged four years, had been brought to hospital by reason of disinclination to walk for the preceding two weeks. Kyphosis had been evident in the lumbar region and an X-ray photograph had revealed collapse of the second lumbar vertebra. By the von Pirquet test positive reactions to human and bovine tuberculins had been obtained.

The child was now under treatment with an anterior Thomas's splint which had been applied in November, 1922.

Renal Calculi.

Dr. H. DOUGLAS STEPHENS invited comment on the case of a boy, aged thirteen years, whom he had treated for multiple renal calculi. The boy had been admitted to hospital in August, 1922, on account of pain in the right lumbar region which had persisted for three weeks. Some pain had attended the act of micturition and it was stated that the patient had experienced a similar attack some years previously. The urine had been heavily charged with blood and pus and it had been remarkable in view of subsequent findings that renal efficiency as determined by the urea concentration test had seemed but little impaired. That both kidneys were enlarged had been discovered by physical examination and X-ray photographs had disclosed multiple calculi in both kidney pelves.

On August 31, 1922, Dr. Stephens had performed the operation of nephrotomy on the left side and had removed three calculi. Hydronephrosis in slight degree had been noted, but the cortex had apparently not been affected by serious pathological change.

On September 25, 1922, the right kidney had been explored; it had contained six calculi in the very much dilated calices and it had been removed on account of the existing pyonephrosis and suppuration within the remaining kidney substance. The boy had made a good recovery, but his renal function had been below normal, as indicated by the urea concentration test. This test had been repeated a few days before the meeting and it had been found that the urine passed at the end of the second hour after the ingestion of urea contained 1.4% of urea.

Chronic Parenchymatous Nephritis Treated by Edebohls's Operation.

Dr. STEPHENS's second patient was a boy, aged four years, who had been in poor health since June, 1922, by reason of nephritis which appeared to have supervened on bronchitis. He had not responded to medical treatment, in the course of which careful dietetic treatment had been practised, including the "salt-free" and "Epstein" dietaries. The frequent insertion of Southey's tubes and *paracentesis abdominalis* had been necessary for the relief of oedema and ascitic collections. Renal function had been investigated by the urea concentration test and a report had been received to the effect that the several urea estimations gave results which were "within normal limits."

The blood had been sent for investigation by the Wassermann test and had been reported as yielding a "partial reaction." No changes had been detected in the ocular fundi.

The operation of decapsulation of the kidneys (Edebohls) had been performed in two stages, an interval of one month being allowed to elapse between them. A report received on the microscopical examination of a piece of excised kidney tissue was to the effect that it exhibited definite inflammatory reaction which had not progressed to the stage of fibrosis.

Since the second operation the child had made definite improvement, as indicated by his general condition and the fact that he was now passing a larger quantity of urine than formerly.

Intracranial Tumours.

In the third instance DR. STEPHENS showed a remarkable example of intracranial tumours as they appeared in a boy of nine years of age. The history given was that the body had suffered from fits for the previous four years. The seizures had been of the Jacksonian type, had commenced in the right arm, at times had remained localized and at others had become generalized and attended by relaxation of sphincters. On some occasions two or three fits had occurred in a day and they had been controlled to some extent by the administration of bromides and "Luminal."

Inquiry into the boy's past history had shown that he had always been backward and that he had been seriously ill four years previously with osteo-myelitis affecting the left femur. The fits had begun during his protracted convalescence from this illness.

On physical examination some broadening of the bridge of the nose and weakness of the facial muscles and of the muscles of the arm on the right side had been discovered. No other clinical signs had been discovered. Serological examination of the blood in respect of syphilis had failed to yield a reaction.

A remarkable X-ray photograph had demonstrated the presence of multiple cauliflower-like tumours in the skull, the largest of which had been situated in the left temporal region.

Operation had been undertaken for the removal of the temporal deposit, which was found to be placed sub-durally and was adherent to but not infiltrating the brain. The tumour, about the size of a hen's egg, had been irregularly nodular and encapsuled and had contained sanguineous material through which were distributed numerous calcareous particles. It had been of such a nature that histological section threw no light on its essential character, as it was quite devoid of cell structure. No tubercle bacilli had been demonstrated in a Ziehl-Neelsen preparation and animal inoculation tests for tuberculosis were in progress. About fourteen days after operation fits had commenced again.

Multiple Hydatids.

DR. STEPHENS demonstrated extreme hydatid infestation in a little girl. The affection had lasted three and a half years. Dr. Stephens demonstrated the situation of a number of cysts and exhibited radiograms relating to them. The examination of the blood for complement fixation power in respect to hydatid was not yet completed, but a precipitin test for echinococcus had been carried out and the finding had been returned as positive. It was interesting to note that the Casoni intradermic reaction with hydatid fluid had not yielded a positive response after the lapse of twenty hours. The total leucocyte count was 11,000 per cubic millimetre and no eosinophilia could be determined in a differential count.

Polio-Myelitis of Long Standing.

DR. STEPHENS's next patient was a girl, aged eight years, who as a result of infantile paralysis contracted several years ago was afflicted with residual flaccid paralysis and wasting of both lower limbs. Acute flexion had taken place at both hip joints and both feet had exhibited a pronounced degree of "foot-drop." There had also been a noticeable eversion of the left heel. The child's only method of progression had been to sit on the ground and propel herself with both hands.

In March, 1921, the Soutar operation had been per-

formed on both sides and correct position had been maintained subsequently by the application of plaster of Paris bandages. Operative measures on the left foot had been undertaken in June, 1921, and had consisted of (i.) shortening of the tendon of the *tibialis posticus* muscle in order to correct the eversion of the heel, (ii.) tenodesis of the *tibialis anticus* and *extensor longus hallucis*, (iii.) shortening and tenodesis of the peroneal tendons. The foot had then been secured in plaster in the over-corrected position.

The girl was now getting about with the aid of crutches and walking calliper splints.

Spastic Paraplegia.

DR. STEPHENS also demonstrated measures adopted for the relief of spastic paraplegia in the case of a girl, aged thirteen years, who was said to have commenced walking at the age of seven years. No reliable information had been obtainable regarding the probability of birth injury. On her admission to hospital in January, 1923, the girl had exhibited extreme spasticity of both lower limbs, the *adductor longus* and *adductor brevis*, right biceps and semi-membranous muscles being especially affected. In the first place the tendons of the *gracilis* and semi-membranous muscles of the right side had been lengthened and in March, 1923, a modified Stoffel operation had been performed on the left side. On this occasion the obturator nerve had been exposed in the pelvis extra-peritoneally and crushed, as were also the muscular branches from the sciatic nerve to the hamstrings. Since the operation the girl had been kept in an abduction frame.

Two other examples of spastic paraplegia were shown by Dr. Stephens, who discussed in connexion therewith the utility of and the results to be anticipated from the Foerster operation.

Tuberculous Kidney.

DR. RUPERT M. DOWNES presented a boy, aged ten and a half years, as having been affected with tuberculous disease of the kidney. The onset of symptoms, comprising enuresis and hæmaturia, had been in June, 1922. Frequent and painful micturition had supervened later and tubercle bacilli had been demonstrated in the urine. The left kidney had been palpable on physical examination. A cystoscopic examination had been carried out and it had been determined that, although the vesical mucous membrane was very much engorged, there was no ulceration. The bladder capacity had been ninety cubic centimetres. The left kidney had been removed six months previous to demonstration, but Dr. Downes said that the boy still exhibited enuresis and a trace of albumin in the urine. In other respects the urinary findings indicated a great improvement on the conditions obtaining prior to operation and there was now very little pus and no tubercle bacilli could be demonstrated.

Fracture of Elbow Joint.

DR. DOWNES showed a disappointing result after fracture of the elbow joint in a boy aged five years. At the time of the original injury in December, 1922, there had been separation and considerable displacement of the capitulum of the humerus. After manipulation under an anæsthetic the arm had been placed in splints in a position of full extension. At the present time the boy was receiving massage and had been instructed in exercises of active movement. The range of movement at the elbow joint was 80° to 130°.

Congenital Syphilis.

DR. DOWNES's third patient was a girl, aged thirteen years, in whom severe *lues* had made its first manifestation as a discharge from the nose after operation for adenoids when she was five years old. She had received intensive treatment with "Nov-arseno-billon," "Intramine," colloidal mercury and mercury by inunction. The Wassermann reaction in the blood serum had formerly been expressed as "P +++." At the present time a reaction was not obtained by the Harrison technique, but the result was recorded as "P ++" when the test was made by the ice-box method.

MR. W. DISMORE UPJOHN, O.B.E., showed a boy, aged ten years, who was suffering from syphilitic periostitis of the

tibiæ and interstitial keratitis. A reaction had been obtained to the complement fixation (Wassermann) test. The point of special interest about this boy was that the keratitis had developed while he was receiving vigorous anti-syphilitic treatment.

Multiple Pneumococcal Infection.

Dr. DOWNES showed a boy, aged two years, who had been admitted to hospital in January, 1923, suffering from right-sided apical pneumonia. A concomitant suppurative dacryocystitis had been shown to be a pneumococcal infection. He had subsequently developed an empyema and this had been followed by suppurative pneumococcal arthritis in both elbow joints, the left knee and left ankle joints. These foci had been treated by aspiration and incision. Dr. Downes expressed the opinion that, in view of the severity and number of the foci, the recovery of the child was remarkable.

Gonorrhœal Polyarthritis in Infancy.

Dr. DOWNES showed a female infant, aged five months, and exhibited a number of skiagrams illustrative of pathological changes in the joints as the result of gonococcal arthritis. Ophthalmia at two weeks of age had been shown to be gonococcal in nature and the infant had subsequently developed purulent arthritis in both hip joints, the left elbow, the right wrist and right knee joints and in the articulations of the tarsus. The arthritis had been treated by aspiration when necessary.

The child's blood had been examined by the complement fixation test with respect to gonococcus at the Walter and Eliza Hall Institute. A positive reaction had been obtained.

Osteo-Myelitis.

Mr. W. DISMORE UPJOHN, O.B.E., showed a girl, aged five years, who had been brought to hospital in September, 1922, with a pyogenic infection of the tissues of the right heel. This had been followed by fever and delirium and complaint of great pain and stiffness in the neck and back. In October, 1922, neck rigidity had been very pronounced and an abscess had appeared in the left pectoral region. Blood culture had been carried out and had yielded a growth of *Staphylococcus aureus*.

By X-ray examination it had been seen that suppuration leading to considerable destruction had occurred in the body of the third cervical vertebra. The abscess had been drained by an incision along the posterior border of the left sterno-mastoid muscle and subsequently a double Thomas's splint with head extension had been applied. Mr. Upjohn pointed out that the child was doing well and that movements of the cervical vertebræ were only slightly restricted.

Mr. Upjohn also exhibited skiagrams showing osteo-myelitis in the terminal phalanx of the finger. The finger had become infected on March 3, 1923, and had been incised two days later.

Circumcision.

Demonstrations were also conducted by Dr. C. W. B. LITTLEJOHN, who showed the results attending four different methods of circumcision.

Skiagrams.

Dr. HERBERT M. HEWLETT had assembled a variety of excellent stereoscopic skiagrams, which he demonstrated.

Pathological Specimens.

Dr. REGINALD WEBSTER provided an exhibit of pathological specimens, the chief feature of which was a collection of natural colour preparations of the bowel secured from infants and young children who had died of bacillary dysentery during the recent summer months.

The actual preparation and mounting of the specimens had been carried out by Dr. H. BOYD GRAHAM. All the specimens showed lesions of varying severity due to the *Bacillus dysenteriae* (Flexner) and their demonstration led to discussion by Dr. Webster of his bacteriological findings in the present season. These were briefly that he had

recovered the *Bacillus dysenteriae* (Flexner) in fifty-three instances, had not met with a genuine "Shiga" infection and had attempted to study the very large number of slow fermenters of lactose which he had encountered.

NOTICES.

THE COUNCIL OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION has arranged the following provisional programme of the Branch meetings. The Scientific Committee reserves to itself the right to modify the arrangement, but it is hoped that no changes will be necessary.

June 6, 1923.

CLINICAL MEETING at the Melbourne Hospital.

July 4, 1923.

At the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne Hospital, at 8.15 p.m..

Mr. W. KENT HUGHES: "Small Defects that Cause Serious Foot Disability and Their Treatment: Corns, Bunions, Hallux Valgus, Hammer-Toe, Weak Ankles, Flat Foot, including Metatarsalgia."

August 1, 1923.

CLINICAL MEETING at the Alfred Hospital.

MISSING JOURNALS.

THE following journals, which have been received by THE MEDICAL JOURNAL OF AUSTRALIA as exchanges, are missing. Each copy bears the stamp impression of this journal. It is requested that the present possessors of these missing journals return them to this office.

The American Journal of Anatomy: May, 1920.

Bulletin of the Johns Hopkins Hospital: April, September, 1916; February, April, July, 1918; September, 1920.

The Journal of Orthopædic Surgery: February, 1921.

New York Medical Journal: February 28, May 29, December 11, 1920; Index, January to June, 1921.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

At the monthly meeting of the Senate of the University of Sydney held on May 7 and 9, 1923, the degree of Bachelor of Medicine was conferred upon CLYDE C. FINLAY and D. A. WILLIAMS in person.

On the recommendation of the Professorial Board, Science Research Scholarships for the period of one year were awarded to the following: Mr. W. G. BAKER, B.Sc., Miss ELSIE J. DALYELL, M.B., Ch.M., Mr. R. S. HUGHESDEN, B.Sc., Mr. F. LIONS and Miss MAY M. WILLIAMS, B.Sc..

On the recommendation of the Faculty of Dentistry it was decided to ask the Royal College of Surgeons, England, to recognize the curriculum of the University of Sydney for the Bachelor of Dental Surgery degree, so as to enable graduates of the University of Sydney to present themselves for the L.D.S. (England).

It was decided that lectures for the diploma in psychiatry should commence next term, beginning on Wednesday, June 6, 1923. The course extends over two terms. Full particulars may be had upon application to the Acting Registrar.

Naval and Military.

APPOINTMENTS.

THE following appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, No. 29, of May 3, 1923:

Australian Military Forces.

SECOND MILITARY DISTRICT.

Australian Army Medical Corps.

To be Lieutenant-Colonels (provisionally)—MAJORS J. J. HOLLYWOOD and R. A. P. WAUGH, 20th April, 1923.

THE provisional rank of Lieutenant-Colonel granted to MAJORS J. J. HOLLYWOOD and R. A. P. WAUGH, which appeared in Executive Minute No. 455/1921, promulgated in *Commonwealth of Australia Gazette*, No. 91, dated 24th November, 1921, is terminated, 19th April, 1923.

Reserve of Officers.

LIEUTENANT-COLONEL H. C. TAYLOR-YOUNG, O.B.E., and CAPTAIN L. M. SNOW are placed on the Retired List, with permission to retain their ranks and wear the prescribed uniform, 1st January, 1923.

THE resignation of CAPTAIN J. C. DOUGLAS of his commission is accepted, 22nd March, 1923.

Australian Army Medical Corps Reserve.

HONORARY CAPTAINS A. J. O'FLANAGAN and J. H. WILSON are retired, under the provisions of Australian Military Regulation 152 (1), 24th April, 1923, and 30th April, 1923, respectively.

THIRD MILITARY DISTRICT.

Australian Army Medical Corps Reserve.

HONORARY MAJOR W. A. WOOD is placed on the Retired List with the rank of Major and with permission to wear the prescribed uniform, 10th May, 1923.

FOURTH MILITARY DISTRICT.

Reserve of Officers.

THE resignation of MAJOR E. J. BROWN of his commission is accepted, 2nd March, 1923.

Australian Army Medical Corps Reserve.

THE resignation of HONORARY CAPTAIN J. LE M. KNEEBONE of his commission is accepted, 3rd January, 1923.

Post-Graduate Work.

SPECIAL LECTURES IN MELBOURNE.

THE MELBOURNE PERMANENT COMMITTEE FOR POST-GRADUATE WORK has issued the following synopsis of the series of lectures to be delivered by DR. J. F. WILKINSON on the disorders of the stomach, duodenum and pancreas.

"Chronic Gastric Disorders.—Anamnesis of Gastric Disorders; Discussion of Symptoms and Their Significance; Physical Examination—Methods of Investigation, Test Meals, X-Ray Examination *et cetera*; Conditions Simulating Gastric Diseases."

"Organic Diseases of Stomach and Duodenum.—Chronic Gastric Catarrh; Ulcer; Carcinoma; Organic Dilatation; Syphilis; Duodenal Ileus; Gastroparesis; Hemorrhagic Gastralgia; Posterior Gastro-Enterostomy Dyspepsia; Gall Stones; Cholitis; Chronic Appendicitis Dyspepsia; Review of Problems of Diagnosis in These Cases; Significance of Gastric Ulcer in Relation to Gastric Cancer."

"Functional Gastric Disorders.—Various Classifications; Hyperchlorhydria; Hypochlorhydria; General Discussion on Treatment; Various Treatment Methods—Sippey, Lenhardt *et cetera*."

"Diabetes.—Types of Glycosuria; Methods of Investigation; Qualitative and Quantitative Tests for Sugar; Ketogenesis and its Treatment; Principles of Treatment of Diabetes—Allen, Joslin, Newburgh and Marsh, 'Insulin'; Details of Methods for Calculating Diets."

THE first lecture will be delivered on Tuesday, June 12, 1923, at 8.30 p.m. at the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne Hospital. The fee for the course is two guineas. Entries may be sent to DR. J. W. DUNBAR HOOPER or DR. JOHN H. ANDERSON at the Anatomy School, University of Melbourne.

Special Correspondence.

LONDON LETTER.

BY OUR SPECIAL CORRESPONDENT.

Conditions of Medical Practice.

IT is a curious feature of these post-war days that a time when general medical practice is distinctly less remunerative than formerly coincides with a period in which the acquisition of an established practice has become noticeably more expensive. In the provinces as well as in London the doctor has experienced six winter months which have been the least busy ones known for at least ten years. At the same time the medical papers are full of advertisements of those wishing to purchase practices and the transfer agents have scores of clients willing to purchase at prices fully 50% higher than those obtaining five years ago. The explanation of the diminished business of the practitioner is found chiefly in the abnormal healthiness of the passing winter—amongst adults influenza, except for mild cases in the past week or two, has been absent and in children cases of measles, scarlet fever and diphtheria have been extraordinarily few, so that, to take a further example, pneumonia has been uncommon at all ages.

Yet this is not the whole truth. A factor of almost equal importance is in the general impoverishment which has constrained all classes to refrain from seeking medical advice except for major ailments urgently needing immediate treatment. The city panel doctor has had fuller surgeries than ever and has not noticed any smaller incidence of "debility," coryza or pharyngitis. The truth is that the average man or woman cannot afford, unless he be an insured person, to attend to any of the minor ailments. This is to be expected when the dockside labourer gets fifty-eight shillings a week and the agricultural labourer twenty-six shillings or less and when amongst the middle classes income tax claims five or six of every additional twenty shillings earned, trade is bad and living costs nine-fifths as much as before the war.

THE increased purchase price of partnerships or goodwill is, of course, chiefly a question of demand and supply. The number of students qualifying increased during the last decade and it has been suggested that the exigencies of war-time led to some—possibly unconscious—lessening of the stringency of examiners in examinations for qualification. Post-war economy has prevented the great numerical increase of whole-time appointments which at one time seemed likely to occur in the public services and the posts as school medical officer, tuberculosis officer, venereal diseases officer and the like have not absorbed any important proportion of the surplus. At the same time naval and military services have been cut down and the colonial medical services have not on the whole become more attractive to the British medical man.

THE *National Insurance Act* has not been without influence in increasing the value of a general practice. Before the passing of the Act the income of the purchaser of

an industrial practice, "club practices" being excepted, was more largely dependent on his talents and personality; during the first eight years of the application of the Act the individual panel patients of a practice were, unless they expressly stated a wish to the contrary, transferred *en bloc* to the purchaser. This additional security had a perceptible effect in increasing transfer value and according to present plans and negotiations it is likely that a buyer will be guaranteed well over twelve months' purchase, although the insured persons as named individuals are not to be transferred except at their expressed request.

The problems facing a would-be purchaser at the present moment are numerous and complicated. Are prices of transfer likely to continue to become greater or to diminish as the cost of living decreases (if it does decrease) and as the consequent and inevitable reduction of fees takes place?

Whether it is wiser to invest in an urban or a rural practice? In the urban practice it is to be feared that at the end of the current year a reduction of the panel capitation fee will perceptibly diminish the income. In rural areas the wave of prosperity which war conditions brought to agricultural industry, has scarcely spent itself, so that the receipts in most rural practices have steadily increased since 1915; at the present time, however, the agricultural labourer's wage is so low that in several areas it is supplemented by poor-law relief, while the farmer is in many cases working at a loss, so that in the coming years rural practitioners will almost certainly be faced with a considerable diminution in income.

Correspondence.

THE MEDICAL HISTORY OF THE WAR.

SIR: For some months now I have been engaged in preliminary work in connexion with the editing for the Commonwealth Government of a narrative of the "problems" which confronted the Australian Army Medical Corps, Australian Imperial Force; to include an account of the manner of their adventuring and solution, together with an attempt to fix, against Time's waste and wear, for the "guidance of future generations," the marks of movement and strife—the "lessons of the war"—which at the time seemed so indelible, but which four brief years have shown to be most quickly erased; so that, even now, various well-worn paths of pre-war error and omission are decorously and serenely re-trodden. To many the reiterated requests for information and material must seem inexplicable and not a little tiresome; but it is necessary to repeat that, concerning the early work of the Australian Army Medical Services, there is great lack of material for more than so bare an outline that life and meaning to its dry bones can be given only by unjustifiable use of imagination and conjecture.

I hope that any members of the Australian Army Medical Services who can, will afford assistance in the form of detail concerning the circumstances, difficulties and mode of fulfilment of the various labours and problems of the Service, of its discords and strivings, its failings and its achievings. After the beginning of 1917, war diaries and records are good; before that, and for 1915 especially, considerable reliance has to be placed on personal assistance by participants in events.

I hope that any who may feel concerned in any aspect of the narrative and who have not yet communicated with me, will do so. However inadequate and unworthy of its subject the "History" may turn out, it must now be produced; and while the editor would be the one most effectually broken by a fiasco, his chief concern is that in the fall would be involved the Service which, while not wanting in human errors, can yet show a notable record of striving and achievement, sufficient perhaps to justify some historical forgetfulness of error or at least philosophic detachment of criticism. On these grounds I venture to ask for any assistance which may be possible now, so that any errors made may be active and of commission— all information is accepted "without prejudice"—and not

of omission. Bluntest speech should be forthcoming now to justify any subsequent darts of criticism.

Yours, etc.,

A. G. BUTLER.

Department of Defence, Melbourne,
May 8, 1923.

Postscriptum.—The editor claims with due modesty a special bump of discretion in the handling of private diaries; his buried memories, so far as he is aware, have not, neither by suggestion nor by analysis, by Bacchus nor by any Delilah, been improperly enticed from their tombs.

A PHILOSOPHICAL CONSIDERATION OF DIVINE HEALING.

SIR: From the point of view of the pure atheist divine healing does not occur. For him everything is natural, nothing supernal.

The argument that follows, relates to the case of the strict monotheist, but with the necessary alterations applies as strongly to that of the polytheist; we may therefore confine our attention to the strictly monotheistic position.

All modern science and the arts arising from it are based on the doctrine of the uniformity of nature; their success in practice constitutes its proof. It is an assumption, but an assumption justified by experience.

During the ages of faith men thought that Nature was inconstant, that events depended not on invariable law, but on the will of supernatural powers. The darkness was gradually dissipated by Copernicus, Galileo and Bruno, till at length Newton showed how a simple law explained the complex movements of the heavenly orbs, which previously seemed to demand continuous divine care, either directly by the finger of God or indirectly by the ceaseless guidance of an angel. Newton was a convinced theist and believed that the law of gravitation was divinely ordained, but he replaced multiple special providences by a single general providence.

Laplace carried the process further, so that on the publication of his "*Mécanique Céleste*" Napoleon taunted him on the omission of the deity from his system. "I had no need of that hypothesis," replied the astronomer. "*Je n'avais pas besoin de cette hypothèse-là.*"

Geology and biology lagged behind astronomy; in them the catastrophist dogma held sway and a famous divine asserted that "the cause of earthquakes is sin." But here Lyell, Spencer and Darwin introduced the idea of natural causation and special providences grew rarer. From meteorology they are not yet expelled, though they are less revered; at a recent service of intercession for rain a minister jokingly commended us to dam the rivers more and curse the climate less. In world politics, too, they obtain; many a cleric asserted that the Great War was a punishment sent by God. Few theologians realize that the conception of a deity omniscient and omnipotent *ab initio* is much loftier than that of a capricious one. Scientists do and continue to banish special providences.

Medicine has followed the same path. The theistic physician recognizes that all healing is divine, but that it occurs only in accordance with law, none the less divine because orderly. "*Je le pensai, Dieu le guérit,*" said Ambroise Paré. The *vis medicatrix naturæ* is all important; the physician does but aid its action. Natural modes of healing have been studied by the pathologist and the art of medicine is based on the ascertained facts of physiology, pharmacology *et cetera*. Yet medicine is incomplete; the physician recognizes his limits and is ready to learn; he adopts inoculation imported from Turkey by a blue stocking, vaccination suggested by a dairymaid, laboratory immunity devised by a chemist. He humbly tests the new. But in the appeal to a capricious deity yielding to importunity there is nought new. It has been tried and found wanting for thousands of years; it is contrary to all natural philosophy. *Le médecin n'a pas besoin de cette hypothèse-là.* Only when it was abandoned did medicine progress. The modern physician feels no obligation to countenance it. He does not deny the value of faith; he

uses suggestion, persuasion, encouragement; but from supernatural intervention in response to pleading he turns away. He is no anarchist. He expects to see improvement after priestly laying-on of hands in persons of five classes:

1. Malingerers who have exhausted the advantages of illness and are anxious for an occasion of sudden restoration.
2. Hysterical sufferers from purely functional symptoms.
3. Hypochondriacs who fancy themselves now worse, now better.
4. Chronic patients whose disease is either temporarily remittent, *exempli gratia*, Addisonian anemia, or characterized by symptoms which vary from time to time, the old fading as the new appear, *exempli gratia*, *tuberculosis dorsalis*.
5. Convalescents.

Yours, etc.,

F. GUY GRIFFITHS.

131, Macquarie Street, Sydney,
May 11, 1923.

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned have been registered under the provisions of the *Medical Act, 1915*, as duly qualified medical practitioners:

- AINSLIE, JAMES PERCIVAL, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital, Melbourne.
- ANDREWS, HOWARD LYLE, M.B., B.S., 1923 (Univ. Melbourne), Halifax Street, Middle Brighton.
- BARRETT, HORACE ROWLAND GUEST, M.B., B.S., 1923 (Univ. Melbourne), Korumburra.
- BAYLEY, ARTHUR WELLESLEY, M.B., B.S., 1923 (Univ. Melbourne), "Anglesey," Burke Road, East Malvern.
- BENNETT, GEORGE FREDERICK, M.B., B.S., 1923 (Univ. Melbourne), 161, Hotham Street, East St. Kilda.
- BOILEAU, GILBERT GEORGE BENSON, M.B., B.S., 1923 (Univ. Melbourne), "St. Croix," Stanhope Street, Malvern.
- BROOME, GERALD DOUGLAS, M.B., B.S., 1923 (Univ. Melbourne), Wonthaggi.
- BURKE, EDMOND PATRICK, M.B., B.S., 1923 (Univ. Melbourne), 549, Station Street, North Carlton.
- BURWOOD, KENNETH BRANSTON, M.B., B.S., 1923 (Univ. Melbourne), Thomas Street, Black Rock.
- BYRNE, CHARLES, M.B., B.S., 1923 (Univ. Melbourne), 308, Dandenong Road, East St. Kilda.
- CARRINGTON, WILLIAM LANGLEY, M.B., B.S., 1923 (Univ. Melbourne), "The Rectory," Daylesford.
- CHAMPION, EILEEN, M.B., B.S., 1923 (Univ. Melbourne), "Koonwarta," High Street, Armadale.
- CHURCH, DOROTHEA VICTORIA, M.B., B.S., 1923 (Univ. Melbourne), "Netherhall," Clendon Road, Toorak.
- COLQUHOUN, COLIN GEORGE BURROWS, M.B., B.S., 1923 (Univ. Melbourne), 210, Walsh Street, South Yarra.
- DALY, KATHLEEN BESSIE, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital, Melbourne.
- D'ARCY, FRANCES FLORENCE, M.B., B.S., 1923 (Univ. Melbourne), St. Vincent's Hospital, Fitzroy.
- DAVIDSON, GEORGE RONALD, M.B., B.S., 1923 (Univ. Melbourne), "Aldene," Bowral Street, East Malvern.
- ELLERY, REGINALD SPENCER, M.B., B.S., 1923 (Univ. Melbourne), 32, Martin Street, Elsternwick.
- FITZPATRICK, DAVID IMRIE, M.B., B.S., 1923 (Univ. Melbourne), Heyfield.
- FREEMANTLE, LESLIE FRANCIS, M.B., B.S., 1923 (Univ. Melbourne), "Thendara," St. Helen's Road, Upper Hawthorn.
- GAULT, ADELAIDE GERTRUDE, M.B., B.S., 1923 (Univ. Melbourne), "Kent," Auburn Road, Auburn.
- GAULT, HENRY WOODALL, M.B., B.S., 1923 (Univ. Melbourne), "Tarrangower," Tooronga Road, Hawthorn.
- GODBEHEAR, WESLEY GEORGE CATCHLOVE, M.B., B.S., 1923 (Univ. Melbourne), 34, Rathmines Street, Fairfield.

- GUTHRIDGE, GEORGE HAROLD, M.B., B.S., 1923 (Univ. Melbourne), 4, Denny Street, Brighton.
- HALLOWS, BRUCE RUDOLPH, M.B., B.S., 1923 (Univ. Melbourne), 69, Claremont Avenue, Malvern.
- HAYDEN, JOHN GERALD EDWARD, M.B., B.S., 1923 (Univ. Melbourne), St. Vincent's Hospital, Fitzroy.
- HENSLEY, ANNIE DOREEN, M.B., B.S., 1923 (Univ. Melbourne), 61, Tooronga Road, Malvern.
- HIRSCHFELD, OTTO SADDLER, M.B., B.S., 1923 (Univ. Melbourne), "Elsinore," Wellington Street, Kew.
- HOLMAN, WILLIAM PROUT, M.B., B.S., 1923 (Univ. Melbourne), 99, Toorak Road, South Camberwell.
- JAMES, CLIVE HENRY REYNOLDS, M.B., B.S., 1923 (Univ. Melbourne), "Clifton," Kintore Street, Camberwell.
- JONES, EDWARD CHARLES BELL, M.B., B.S., 1923 (Univ. Melbourne), 291, New Street, North Brighton.
- KING, EDGAR SAMUEL JOHN, M.B., B.S., 1923 (Univ. Melbourne), Alfred Hospital, Prahran.
- KING, THOMAS, M.B., B.S., 1923 (Univ. Melbourne), "Rosemont," Balaclava Road, Caulfield.
- MAY, REGINALD FRANK, M.B., B.S., 1923 (Univ. Melbourne), Darebin Street, Heidelberg.
- MEAGHER, JOHN SHEEHY LUXFORD ALOYSIUS, M.B., B.S., 1923 (Univ. Melbourne), 69, Wattle Road, Hawthorn.
- MILLAR, THOMAS GLASS, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital, Melbourne.
- MURDOCH, GEOFFREY GEORGE HOLSTEIN, M.B., B.S., 1923 (Univ. Melbourne), Romsey.
- MURDOCH, NOEL, M.B., B.S., 1923 (Univ. Melbourne), Romsey.
- NEVILLE, DAVID WILLIAM, M.B., B.S., 1923 (Univ. Melbourne), Deepdene Road, Balwyn.
- NORTH, EDGAR ALEXANDER, M.B., B.S., 1923 (Univ. Melbourne), "Rowella," West Tamar, Tasmania.
- O'DAY, KEVIN JOHN, M.B., B.S., 1923 (Univ. Melbourne), 102, Esplanade, Middle Brighton.
- OLDHAM, ALFRED, M.B., B.S., 1923 (Univ. Melbourne), Fairfield Hospital, Fairfield.
- OSBORNE, ETHEL ELIZABETH, M.B., B.S., 1923 (Univ. Melbourne), The University, Melbourne.
- PATRICK, MATTHEW CHALMERS, M.B., B.S., 1923 (Univ. Melbourne), 5, Margaret Street, Canterbury.
- PLOWMAN, SIDNEY, M.B., B.S., 1923 (Univ. Melbourne), "The Tofts," Frankston.
- PODGER, VALENTINE CHARLES, M.B., B.S., 1923 (Univ. Melbourne), Koorara, via Terang.
- RAE, DAVID ERNEST, M.B. et Ch.B., 1908 (Univ. Aberdeen), 300, Hgn Street, Windsor.
- REID, COLIN CAMPBELL, M.B., B.S., 1923 (Univ. Melbourne), "Indi," Chiltern.
- ROSS, KEITH CHISHOLM, M.B., B.S., 1923 (Univ. Melbourne), Melbourne Hospital, Melbourne.
- SHARLAND, JAMES LEONARD WOODROFFE, M.B., B.S., 1923 (Univ. Melbourne), 76, Aberdeen Street, Geelong.
- SHARWOOD, BEATRICE, M.B., B.S., 1923 (Univ. Melbourne), 200, Auburn Road, Auburn.
- SHEIL, DOMINIC VICTOR, M.B., B.S., 1923 (Univ. Melbourne), 510, Rathdowne Street, North Carlton.
- SHILLIDAY, JAMES ERNEST, M.B., B.S., 1923 (Univ. Melbourne), Langtree Avenue, Mildura.
- SMALL, RONALD HERBERT, M.B., B.S., 1923 (Univ. Melbourne), 6, Glen Eira Road, Ripponlea.
- TOWNSEND, ALAN ROBERT, M.B., B.S., 1923 (Univ. Melbourne), 62, Mont Albert Road, Mont Albert.
- WOODS, JOHN GRIEVE, M.B., B.S., 1923 (Univ. Melbourne), Alfred Hospital, Prahran.

Name of Practitioner Changed and Restored to the Register.

YOUNG, ETHEL, *née* Good, M.B., 1906, Ch.B., 1907 (Univ. Melbourne).

Additional Diploma Registered.

KELLY, JOHN HORACE, M.D., 1923 (Univ. Melbourne).

Names of Deceased Practitioners Removed from the Register.

UTBER, WALTER BIRD. YOUNG, ROBERT PERCY.

Books Received.

- ADDRESS AND PAPERS: DEDICATION CEREMONIES AND MEDICAL CONFERENCE, PEKING UNION MEDICAL COLLEGE, SEPTEMBER 15-22, 1921, PEKING, CHINA; 1922.** Published at New York by the Trustees and Faculty of the Peking Union Medical College, 61, Broadway; Demy 4to., pp. xiv. + 416, with 33 illustrations.
- AIDS TO OPERATIVE DENTISTRY,** by J. D. Hamilton Jamieson, H.D.D., L.D.S. (Ed.); 1923. London: Baillière, Tindall & Cox; Fesp. 8vo., pp. vii. + 163, with nine figures. Price: 3s. 6d. net.
- AN INDEX TO GENERAL PRACTICE,** by A. Campbell Stark, M.B. and B.S. (Lond.), L.S.A. (Eng.), Ph.C.; 1923. London: Baillière, Tindall & Cox; Crown 8vo., pp. x. + 181. Price: 5s. net.
- ANNUAL REPORT OF THE SURGEON-GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES FOR THE FISCAL YEAR 1922.** Washington: Government Printing Office; Demy 8vo., pp. 330.
- HANDBOOK FOR MENTAL NURSES,** published under the Authority of the Medico-Psychological Association; Seventh Edition; 1923. London: Baillière, Tindall & Cox; Demy 8vo., pp. xiv. + 640, with two plates and nineteen figures in the text. Price: 6s. net.
- MINOR SURGERY, INCLUDING BANDAGING,** by Henry R. Wharton, M.D.; Ninth Edition, thoroughly revised; 1923. London: Baillière, Tindall & Cox; Demy 8vo., pp. xii. + 647, with 450 figures in the text. Price: 18s. net.
- REST AND OTHER THINGS: A LITTLE BOOK OF PLAIN TALKS ON TUBERCULOSIS PROBLEMS,** by Allen K. Krause; 1923. Baltimore: Williams & Wilkins Company; Crown 8vo., pp. 159. Price: \$1.60.
- THE "NAUHEIM" TREATMENT OF DISEASES OF THE HEART AND VESSELS IN ENGLAND,** by Leslie Thorne Thorne, M.D., B.S. (Durham), M.R.C.S. (Eng.), L.R.C.P. (Lond.); Sixth Edition; 1923. London: Baillière, Tindall & Cox; Demy 8vo., pp. viii. + 232, with 135 figures. Price: 7s. 6d. net.
- THE PATHOLOGICAL PHYSIOLOGY OF SURGICAL DISEASES: A BASIS FOR DIAGNOSIS AND TREATMENT OF SURGICAL AFFECTIONS,** by Professor Dr. Franz Rost, University of Heidelberg; Authorized Translation by Stanley P. Reimann, M.D., with a Foreword by John B. Deaver, M.D., LL.D., Sc.D., F.A.C.S.; 1923. Philadelphia: P. Blakiston's Son & Company; Demy 8vo., pp. xiv. + 535. Price: \$6.00.
- VITAL FACTORS OF FOODS: VITAMINS AND NUTRITION,** by Carleton Ellis, S.B., F.C.S., and Annie Louise Macleod, Ph.D.; 1923. London: Chapman & Hall, Limited; Sydney: Angus & Robertson, Limited; Royal 8vo., pp. xvii. + 391, with twenty-two illustrations. Price: 30s. net.

Medical Appointments.

THE DAVID STYME RESEARCH PRIZE for 1923 has been awarded to Dr. F. L. APPERLY (B.M.A.), Senior Lecturer in Pathology at the University of Melbourne.

DR. F. E. DAWSON (B.M.A.) has been appointed Government Medical Officer at Milton, New South Wales.

THE undermentioned have been appointed members of the Advisory Committee in connexion with medical inspection in the State Schools of Victoria: SIR J. W. BARRETT, K.C.M.G. (B.M.A.), Dr. B. T. ZWAR (B.M.A.), Dr. EDITH H. BARRETT (B.M.A.), Dr. E. ROBERTSON (B.M.A.), Dr. T. W. SINCLAIR (B.M.A.).

THE following have been appointed Public Vaccinators in Victoria: Dr. S. H. HALAHAN (B.M.A.), at Spring Vale, Dr. R. I. SWEETNAM (B.M.A.) at Yea.

DR. C. H. WESLEY (B.M.A.) has been appointed Honorary Relieving Assistant Surgeon to the Royal Alexandra Hospital for Children, Camperdown, New South Wales.

Medical Appointments Vacant, etc..

FOR announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xviii.

ADMINISTRATION OF NAURU: Medical Officer.
STATE PUBLIC SERVICE, QUEENSLAND: Director of the Laboratory of Microbiology and Pathology and Bacteriologist and Analyst.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30-34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phoenix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Manchester Unity Independent Order of Oddfellows Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

- MAY 22.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
MAY 24.—Brisbane Hospital for Sick Children: Clinical Meeting.
MAY 25.—New South Wales Branch, B.M.A.: Branch.
MAY 25.—Queensland Branch, B.M.A.: Council.
MAY 30.—Victorian Branch, B.M.A.: Council.
MAY 31.—South Australian Branch, B.M.A.: Branch.
JUNE 1.—Queensland Branch, B.M.A.: Branch.
JUNE 6.—Victorian Branch, B.M.A.: Branch.
JUNE 8.—New South Wales Branch, B.M.A.: Clinical Meeting.
JUNE 8.—Queensland Branch, B.M.A.: Council.
JUNE 8.—South Australian Branch, B.M.A.: Council.
JUNE 12.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 13.—Western Australian Branch, B.M.A.: Council.
JUNE 13.—Melbourne Pædiatric Society.
JUNE 14.—Victorian Branch, B.M.A.: Council.
JUNE 15.—Eastern District Medical Association, New South Wales.
JUNE 19.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Editorial Notices.

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